THE PACKAGING DESIGNER'S BOOK OF PATTERNS

FOURTH EDITION

LASZLO ROTH & GEORGE WYBENGA

The Packaging Designer's Book of Patterns

Fourth Edition

George L. Wybenga
László Roth

John Wiley & Sons, Inc.

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Preface to the Fourth Edition

When originally published in 1991, this book was the first definitive collection of patterns and structural designs for paperboard packaging, point-of-purchase displays, and other three-dimensional graphic products. That first edition contained over 450 patterns and structural designs that were intended to be adapted for packaging.

This fourth edition continues to be the most definitive collection of patterns available, but it now contains well over 600 patterns. The designer may choose among hundreds of alternative carton and box structures, which may be used as they are, modified, or adapted to create exciting new structures. The patterns are accompanied by a description of the historical and technical origins of the materials and methods used. Special attention is given to computer-aided design as an engineering tool that offers new insights into carton and box design and manufacturing.

Paperboard packaging has a profound impact on the global economy. In 2011, the global paper packaging market was estimated to be worth $236 billion. The increasingly consumer driven market will continue to grow globally, especially in North America, China, and India as eco-friendly solutions, technological improvements, and improving paper barrier properties continue to gain greater consumer acceptance.

The packaging materials industry serves every major retail environment. If it is to continue to thrive, it must also continue to be creative and innovative. It must be market oriented and must continually supply new methodologies and new solutions to environmental problems. Along with sensitivity to environmental problems, creativity should be the designer's most important consideration. This workbook may be used not only as a reference for structural design but also as a source of exercises in learning to stimulate creative skills. The cartons shown in this book are designed to depict generic styles whenever possible. Each illustration is accompanied by the name that is commonly used to describe the style.

Some of the packages currently in use are patented or have patent-protected features for use on proprietary packaging machinery. Where appropriate, patented features are indicated. The reader is advised that patented features are protected by patent law and may not be used in practice without the express permission of the patent holder. For information about patents, contact the U.S. Patent Office.

Foreword

The Packaging Designer's Book of Patterns has been *the* reference guide for students and faculty in the Packaging Design Department at The Fashion Institute of Technology since the first edition. In fact, there are few professional resources that have been as valuable an asset as this book. There are multiple copies floating around a classroom on any given day, students search out copies when they did not bring their own to school, faculty regularly refer to the content of each revised edition as they guide students through the design process, alumni treasure their book as the go-to resource and design professionals across the globe look forward to each revised edition with the latest patterns.

Packaging design is a complex endeavor. While effective packaging design includes color, typography, and graphics, structure is among the most essential and influential components. The structure in the final produced design can ultimately lead to a products marketing success. In fact, research has proven that a packaging's structure is one of the most influential factors in attracting a consumer and creating brand recognition. The most effective structures are designed to satisfy many prerequisites including security, protection, compatibility with other structures within a system, ability to identify the brand, adaptability to the retail environment, and in-use and storage requirements.

The desire to satisfy the complex structural design goals of a packaging assignment is influenced by many factors and choices made by designers. The packaging structure's pattern and the proven ability for that pattern to be produced and reproduced are critically important. With the hundreds of patterns that can serve as the framework for the packaging's structure, the choices for a designer can be overwhelming and endless. Many patterns are intricate, complicated, or unusual. Even the structures that appear to be the simplest layout can be challenging for a designer to visualize, assemble or construct. Skills such as precision and attention to detail are among those required in recreating the patterns for a packaging structure.

This book, therefore, with the most up-to-date, highest quality, innovative, comprehensive and proven patterns enables packaging designers to achieve their project specific design objectives with precision. George Wybenga's research into every possible paperboard structure used in packaging design, along with his ability to deconstruct and recreate these structures into usable patterns, saves designers and their clients thousands of hours in research and labor. These patterns enable designers to create packaging designs—and ultimately serve their clients' needs—with confidence. Since the patterns detailed throughout are easily created using paperboard—when designed appropriately—this book supports the sustainable goals that should be at the core of any packaging design project.

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1

Introduction

17th Century Dutch Paper Mill

Paper is among the noblest of human inventions. It is worthwhile, therefore, to begin with a short history of papermaking.

Before books could be written and preserved, a writing surface had to be developed that was light, not too bulky, and was easily stored. The first great advance was the Egyptians' use of papyrus in the third millennium B.C. Sheets of beaten papyrus stems were fastened together into scrolls, some more than 120 feet long, that could be rolled up for storage. After papyrus came parchment, which was perfected in Asia Minor in the city of Pergamum (from which its name is derived) in the second century B.C. Animal skins had long been used as a writing surface in Greece and Rome, but it was in Pergamum that methods were evolved for the production of a durable, velvet-smooth parchment that could be written on on both sides.

Detail of an Egyptian papyrus scroll (ca. 2500 B.C.).

For hundreds of years all paper was made by hand from rag pulp. The use of wood fibers to make paper was discovered in the mid-1800s. In 1840 Friedrich G. Keller in Germany invented a way to grind logs into a fibrous pulp; this method produced a rather poor quality of paper, as all parts of the wood—not just the fibers—were used.

Paper as we know it today was first made in China in 105 A.D. Ts'ai Lun, a member of the court of Emperor Ho Ti, succeeded in turning husks of cotton fibers into paper pulp. This method spread throughout China, Korea, and Japan and as far west as Persia. In 751 A.D. Moslems captured a Chinese paper mill in Samarkand and learned the method of papermaking. They brought the method to Spain around 950 A.D., and by the thirteenth century paper mills had been established throughout Western Europe, first in Italy and then in France, Germany, England, and Scandinavia.

The first paper mill in America was built in 1690 by William Rittenhouse near Philadelphia. Sheets of paper were produced one at a time until 1799, when Nicholas Louis Robert developed a continuous process. (This method was patented in England by the Fourdrinier brothers and is known by that

Egyptian scribe using paper made from papyrus.

Early Chinese print on paper (ca. 300 A.D.).

name.) In 1817 the first cylinder-type papermaking machine, which can produce a better quality of paper in a continuous process, was invented by John Dickenson.

MODERN PAPERMAKING

Today almost all paper is manufactured from wood. Cellulose fibers (which account for 50 percent of the content of wood) are the primary ingredient, followed by lignin (about 30 percent), which acts as a fiber binder or glue.

Water plays an important role in modern papermaking. The manufacture of 1 ton of paper requires about 55,000 gallons of water, most of which is recycled. The papermaking process also uses sulfur, magnesium, hydroxide, lime, salt, alkali, starch, alum, clay, and plastics (for coating). There are two basic types of paper: fine paper for writing and paper for printing and industrial use (packaging).

The first step in manufacturing paper from wood is to remove the bark. The cheapest way to separate the fibers is to grind up the wood by forcing the logs against grindstones submerged in water. The water carries off the wood fibers.

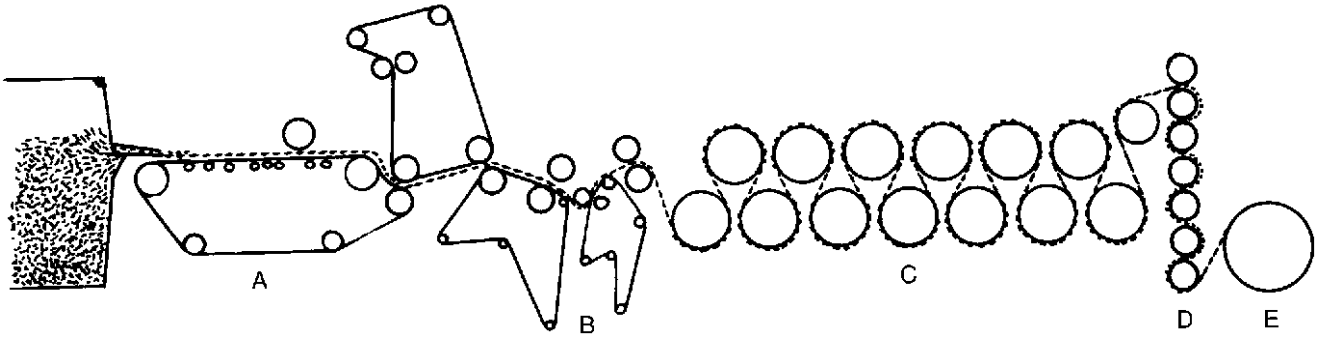


Diagram of a papermill (greatly simplified). The pulp is ejected in a thin layer onto the conveyer-sieve (A). The pulp is then pressed through a great number of cylinders (B) and dried by a series of heated cylinders (C). It is then calendered (D) and taken up by the web (E).

In this process everything is used, and the paper produced is of low quality. Another, more frequently used process is chemical pulping, in which the wood is chipped into small pieces, the fibers are extracted through a chemical process, and the unusable material is eliminated. Chemical pulping is more expensive, but it produces better-quality paper.

Chemical pulping creates a pulp, which is then refined by washing and separating the fibers. Refinement, a time-controlled process during which the manufacturer can add various chemicals to increase bonding, texture, and water resistance, increases the quality and strength of the paper. Pigments (for coloring) and coatings (plastics) can also be added at this stage.

Once the pulp is prepared, it goes to one of two types of machines: The Fourdrinier, or the cylinder machine. Modern papermaking machines are huge. They can be as long as a city block and several stories high. They produce paper up to 30 feet wide at a speed of 3,000 feet per minute, resulting in 800 miles of paper a day! The primary papermaking machine is the Fourdrinier. Most Fourdrinier machines make only one layer of material, although they can be equipped to make several layers.

Paper produced by a Fourdrinier machine is smoothed by a stack of highly polished steel rolls, a process known as calendering. The finished paper is then cut, coated, and laminated.

Another frequently used papermaking machine is the cylinder machine. This machine makes heavy grades of paperboard, generally using recycled paper pulp. The pulp is built up in layers. Since paperboard is much thicker than paper, the drying operation is far more extensive. Large steam-heated cylinders drive the excess moisture out of the paper. A coating is then added to create a smooth surface.

The great advantage of the cylinder machine is that it uses large amounts of recycled paper in thick layers to provide strength.

Paper is bought on the basis of the weight (or basis weight), in pounds, of a ream of paper. (A ream is equal to 3,000 square feet of surface.) The thickness of paperboard is expressed in caliper points, which are stated in thousandths of an inch (usually written in decimals). Since most papers are laminated or coated with other materials, caliper points are rarely used today to specify weight. The paperboard used in folding cartons is specified according to the size of the carton or, more often, the weight of the item that goes into it. A glass bottle for 3.5 fluid ounces of fragrance, for example, would require a folding carton with a thickness of approximately 18 to 24 points.

The thickness of paper can be controlled by means of calendering, pressing, and laminating. High-quality paper is up to 12 points thick; paperboard varies in thickness from 12 to 70 points.

About 20 million tons of fine papers are used for printing and writing annually. Five and a half million tons are used for packaging. Table 1, Table 2, and Table 3 list the major boxboards and papers used in packaging. The uses, content, and characteristics of these packaging materials are described.

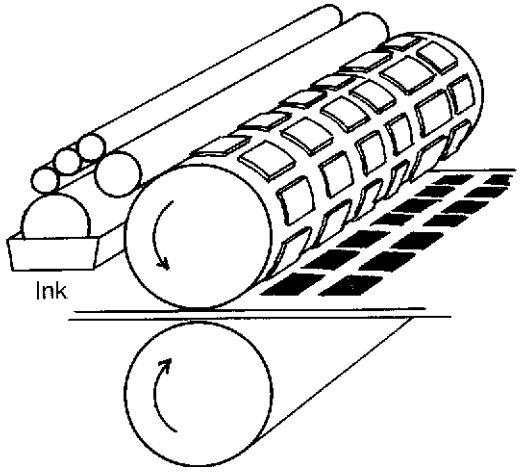
PRINTING, FINISHING, AND DIE-CUTTING

Folding cartons are manufactured using three main processes: printing, die-cutting, and finishing.

Printing Methods

Several methods of printing are available; they include letterpress, offset lithography, gravure, flexography, and silk screen. Each method is suitable for particular types of jobs.

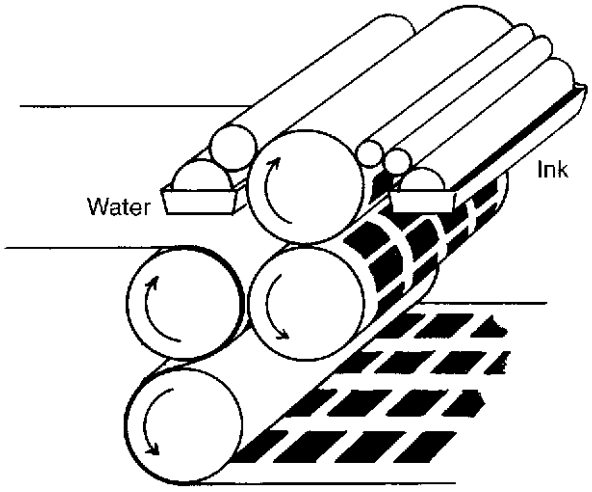
The *letterpress* method transfers ink from a metal plate directly to the sheet paperboard. This is one of the oldest methods of quality



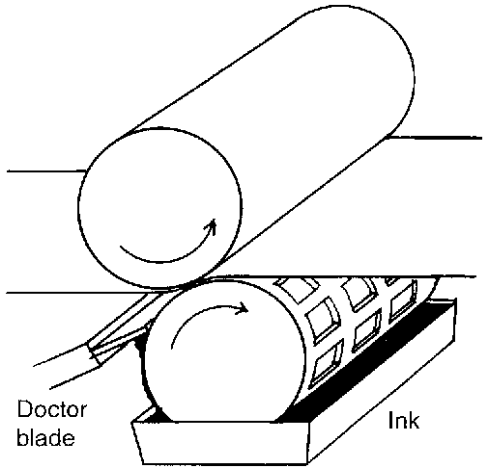
Letterpress: The ink is applied to the raised surfaces of the plate and transferred to the substrate.

printing. New technologies have rendered it almost obsolete. *Offset lithography* has replaced letterpress because of its production efficiency and high-quality color reproduction. New high-speed presses and computer-aided systems, along with technological advances in inks and coatings, have made "offset" the most popular process for printing on folding cartons. In this process specially sensitized metal plates are chemically treated to accept ink. The ink is transferred from the plate to a smooth blanket roller, which then transfers the image to the paperboard.

Gravure printing is used for high-quality reproduction in large-quantity runs (i.e., millions of copies). Specially etched printing cylinders have cells that accept and store inks. A "doctor blade" wipes off excess ink as the cylinder rotates to the impression cylinder, where the plate cylinder transfers the image to the paperboard. Gravure printing can be accomplished on an in-line web



Offset lithography: The ink is picked up by the pre-wetted plate, which transfers the inked image to the offset blanket, which in turn transfers the image onto the substrate.



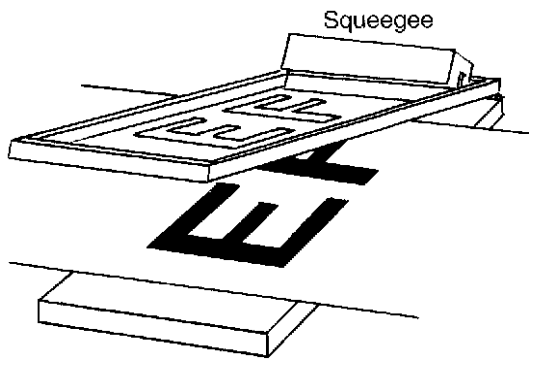
Gravure (Intaglio): The ink is applied over the entire plate, scraped off the surface by the doctor blade, and transferred from the ink wells onto the substrate.

press, which is known as *rotogravure,* or on a sheet-fed press, which is called *photogravure.*

Flexographic printing is similar to letterpress printing. It uses a raised positive composition plate made of rubber or plastic. High-speed in-line web presses are used. This process has been associated with low-quality simple line art printing, but recent technological breakthroughs with fast-drying inks have made flexographic printing a low-cost, high-quality method for medium production runs.

Silk screening is a simple method of color printing in which a fabric mesh stretched over a frame is used instead of a printing plate. A stencil-type design is adhered to the mesh and pigment is "squeegeed" through the stencil. A separate "stencil" is required for each color used. (See diagram.)

Printing technology has changed in recent years to better meet the needs of carton manufacturing. Special coatings, varnishes, lacquers, and inks are available to give a bright finish or provide a moisture-proof barrier. Environmental problems have been alleviated by the introduction of water-based coatings and inks.



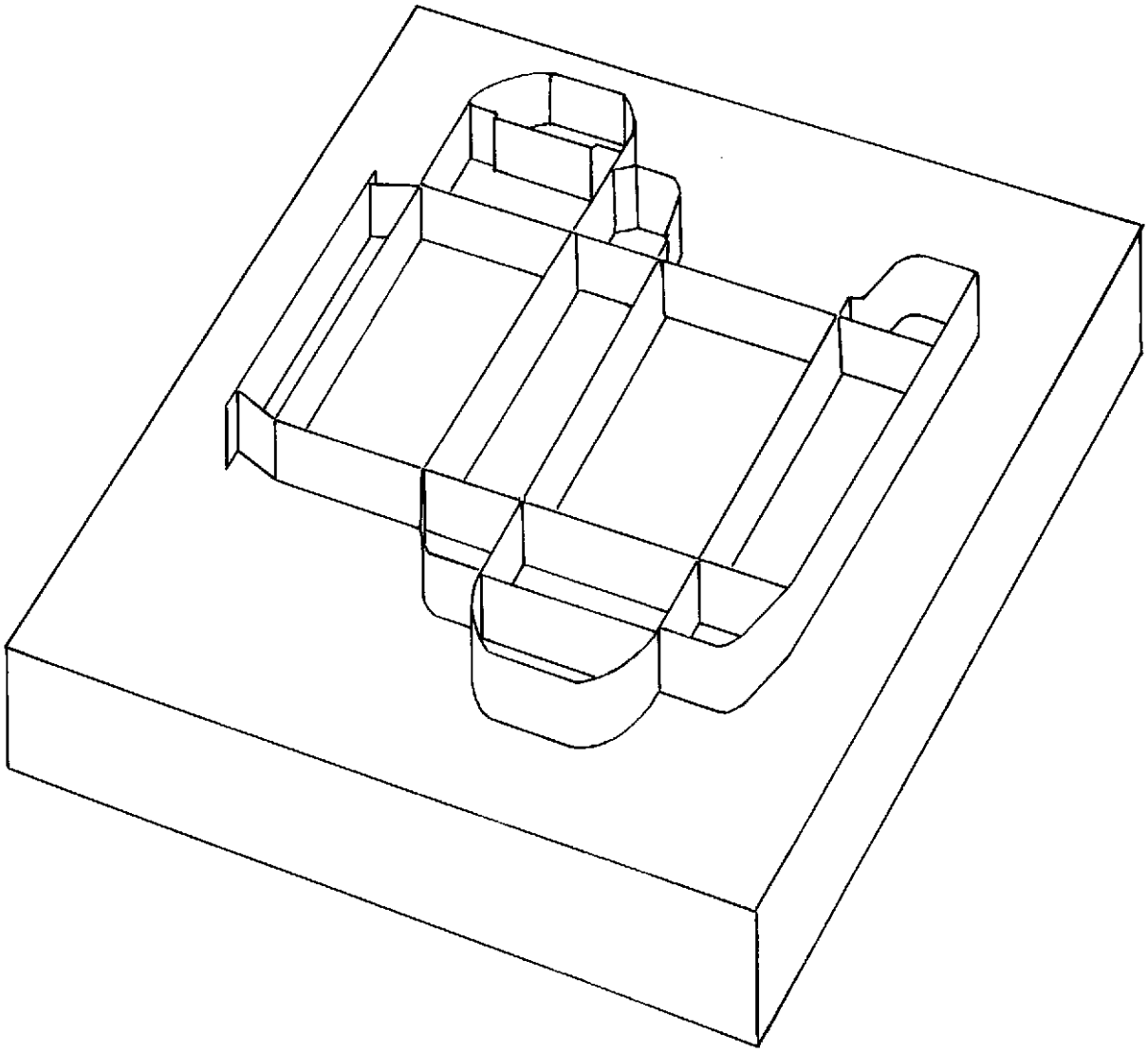
Silkscreen: The ink is squeegeed through a stencil adhered to the mesh of the silk onto the substrate.

Die-cutting

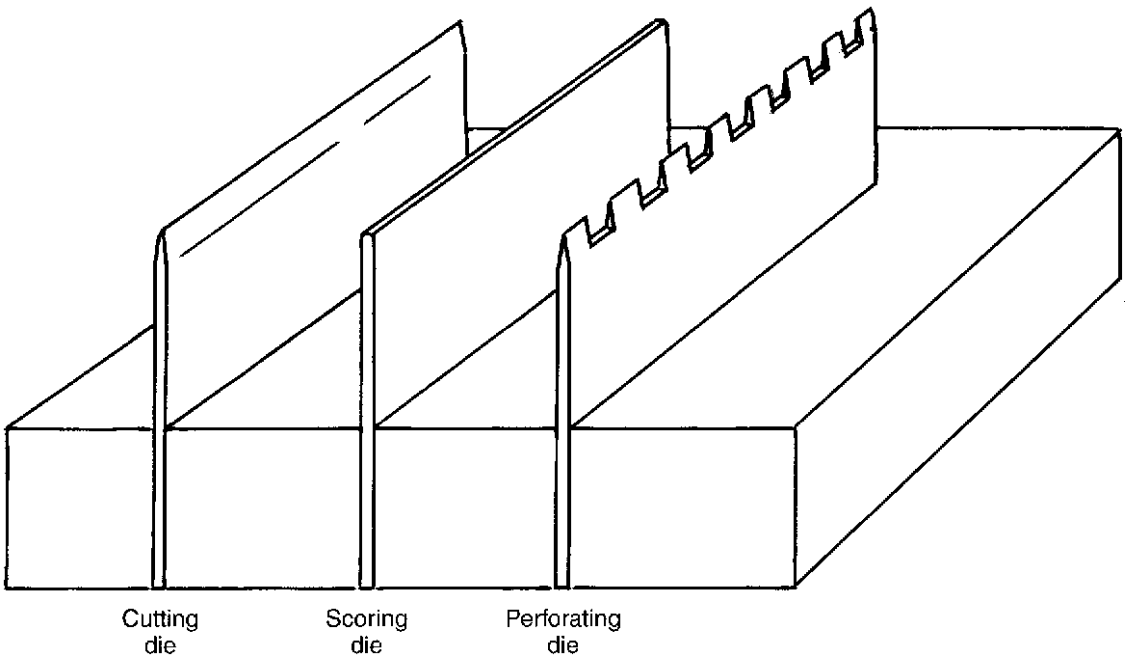
The process of *die-cutting* involves creating shapes using cutting and stamping dies. There are three methods of die-cutting. *Hollow* die-cutting is done with a hollow die, which looks like a cookie cutter. This method is used exclusively for labels and envelopes. *Steel rule* die-cutting is used when a close register is required. Steel rules are bent to the desired shape and wedged into a ¾" piece of plywood. The die is locked up in a chase on a platen of the die-cutting press. Several sheets can be cut at once. A flatbed cylinder press can also be used for die-cutting.

The third method of die-cutting uses *lasers,* which were invented by C. H. Townes and Arthur Schawlow in 1958. (The word *laser* is an acronym for "light amplification by simulated emission of radiation.") The laser beam, which can be concentrated on a small point and used for processes such as drilling, cutting, and welding, has become widely used in manufacturing, communications, and medicine. Since a laser beam is extremely sharp and precise, the resulting cut is very accurate and clean.

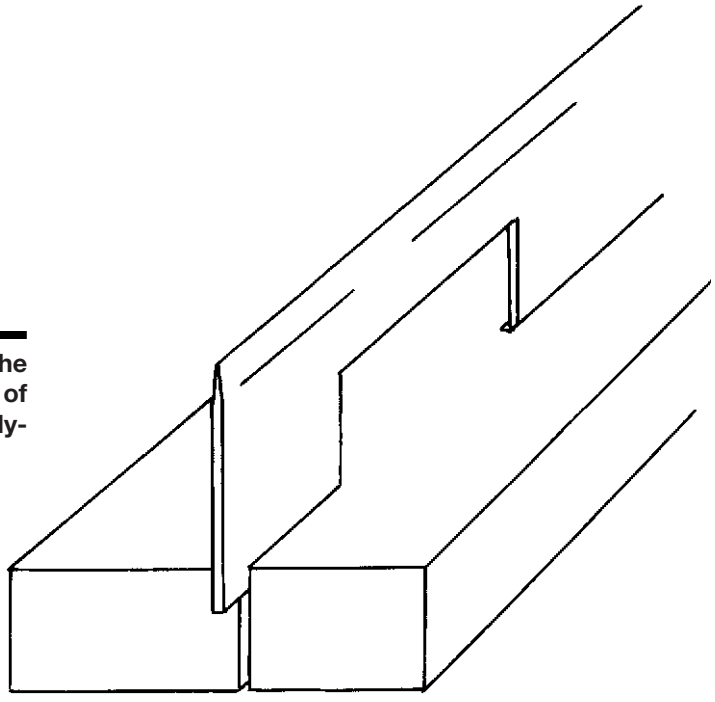
Laser cutout.



Steel rule die. This is a typical sample maker's die for a reverse-tuck carton. The die consists of scoring and cutting rules inserted into a sheet of plywood. A production die will have a great number of box layouts ganged so as to create as little waste as possible. Production dies are on either a flat sheet or a cylinder.

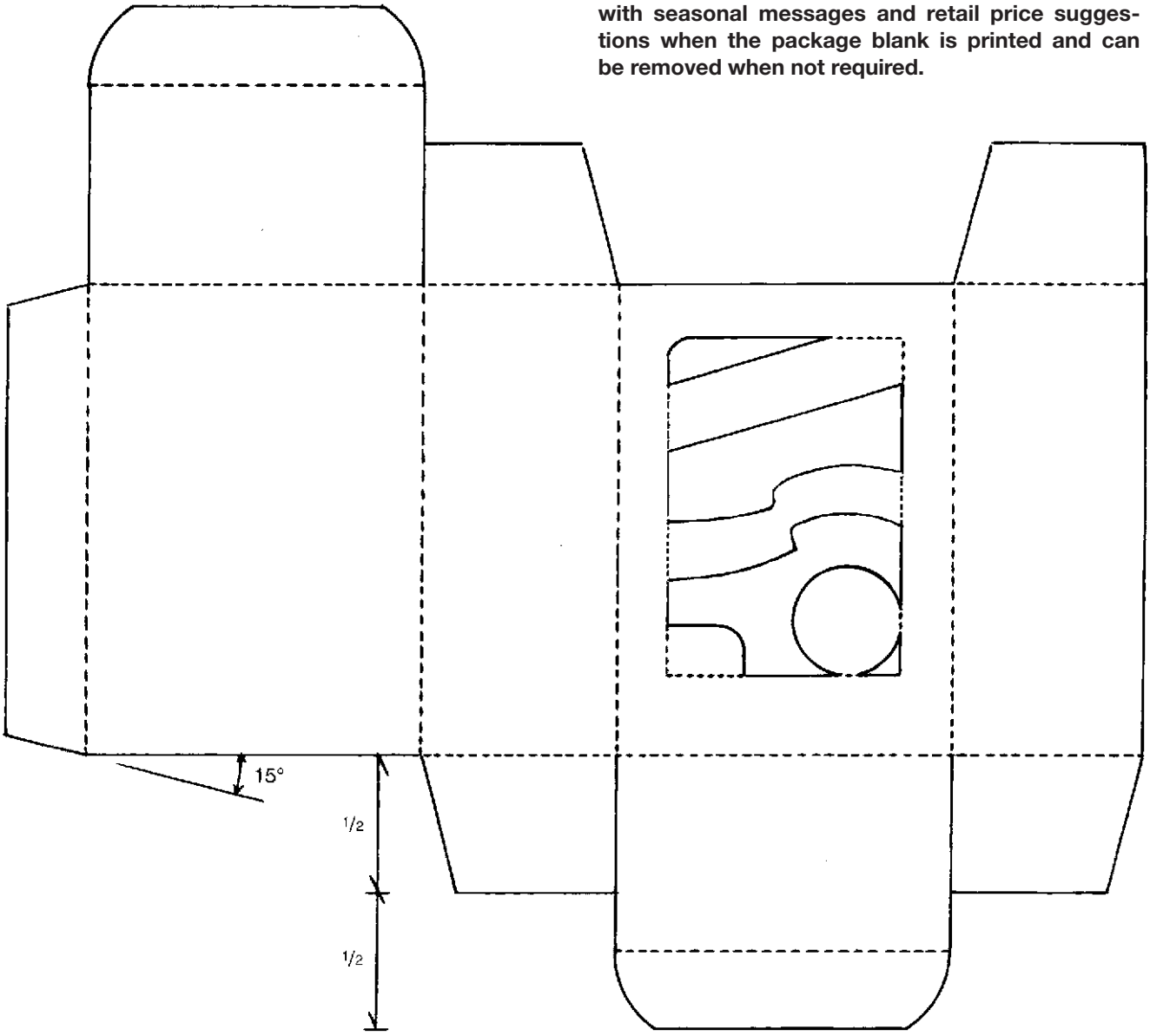


Dies for cutting, scoring, and perforating.



The steel die rule is completely embedded in the plywood, except where notches have been cut out of the bottom of the rule to prevent pieces of the plywood from dropping out.

Windows may be die-cut out of the face panel or extended into the top or side panels. They may be made in any shape desired for the final graphic solution. When laying out the window shape, consider leaving several shapes that may be printed with seasonal messages and retail price suggestions when the package blank is printed and can be removed when not required.



Embossing. Paper and board lend themselves to *embossing,* the process by which a design image is made to appear in relief. Embossing can be superimposed on printing or done on blank paper (blind embossing) for a sculptured three-dimensional effect. It is achieved by pressing a sheet of paper between a brass female die and a male bed, or counter, both of which are mounted in register on a press. Embossing is generally used on prestigious packages; on packaging for cosmetics, gifts, and stationery; and on promotional materials.

Finishing

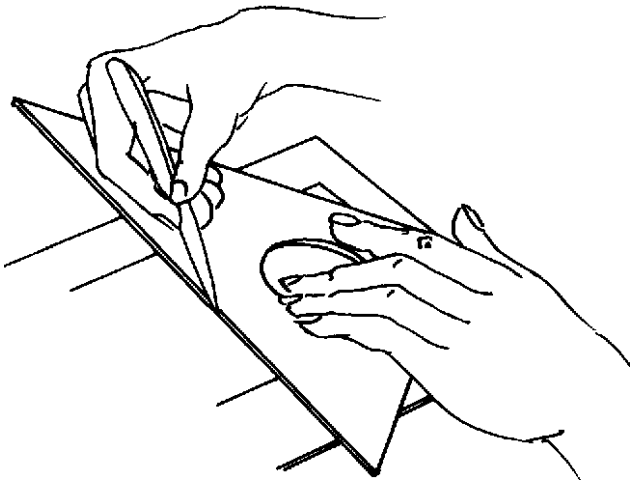
Finishing operations include gluing (using adhesives), windowing (die-cutting), coating, and laminating.

There are several types of gluing equipment, each designed for specific purposes. Right-angle gluers are used for Beers-style and six-corner construction; straight-line gluers are used for side seams and automatic bottom-closured cartons. Automatic tray-forming devices are used in the manufacture of tapered trays, clamshells, and scoop-style cartons. Today computer-controlled multipurpose gluers are used in most large paperboard-manufacturing plants.

A wide variety of specially formulated adhesives are used for specialty cartons made of coated, laminated, and plastic materials. Environmental conditions such as high moisture levels, freezing temperatures, sterilization, and microwaving require specific types of adhesives. Many types of adhesives are available, including self-adhesive and pressure-sensitive labels, resin emulsion adhesive for coated boards, and cold- or hot-melt adhesives for plastics.

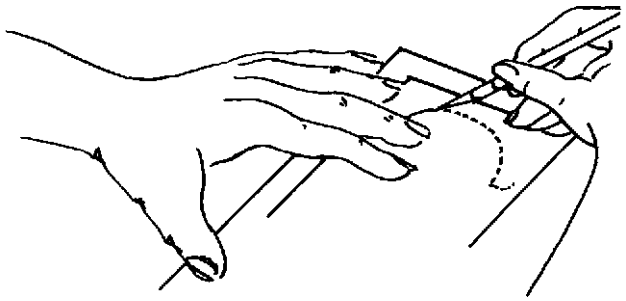
Scoring. Paper and board come in flat sheets or rolls. In all papers and boards the fibers are aligned in one direction, called the *grain.* If they are torn with the grain, the edges will be smooth. If they are torn against the grain, the edges will be ragged.

When scoring the fold lines on the comprehensive, only *compress* the fibers of the paper, do not crush or cut them. Use a dull knife or letter opener. With practice you should be able to score on one side of the paperboard and achieve clean folds. Use white glue sparingly on the glue flaps. A thin coat of rubber cement may be used for covering papers, foils, or fabrics. *Caution:* rubber cement is highly flammable and toxic; library paste is the preferred alternative.



Scoring

Cutting. To facilitate the preparation of a packaging comprehensive, lay out the pattern carefully with triangle and T-square on the appropriate paper stock. Two-ply or three-ply are ideal for comps. Use a resilient backboard to score and cut; the chipboard on the back of drawing pads or a self-healing cutting board are great for this purpose. Use a steel straightedge for straight lines. To prevent sliding, glue a few strips of fine sandpaper to the back of the straightedge. An X-Acto® knife is easy to control for both straight and curved lines. Keep fingers well away from the cutting blade.



Cutting

Table 1. BOXBOARDS USED IN PACKAGING: CYLINDER MACHINE GRADES

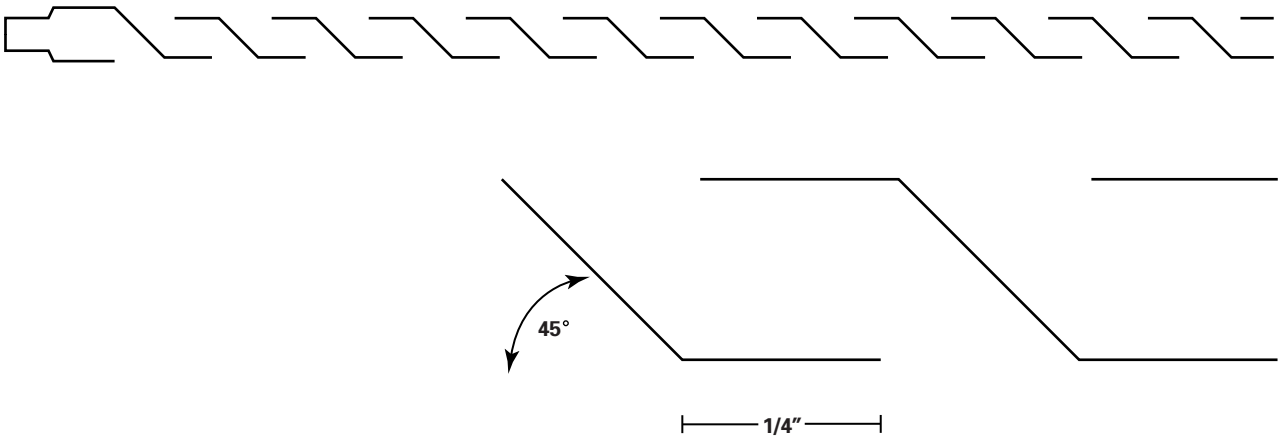
Board	Uses	Chief Characteristics
Plain chipboard; solid newsboard; news vat-lined chip; filled news	Used in the manufacture of set-up boxes.	100% recycled. Lowest-cost board produced; not good for printing. Color is light gray to tan. Adaptable for special lining papers.
White vat-lined chipboard	Higher-grade set-up box with white liner.	Adaptable for color printing.
Bending chip	Folding cartons for light items.	100% recycled, excellent bending. Lowest-cost board for folding cartons.
Colored manila-lined bending chip	Same as bending chip.	Bright white liner, excellent for color printing.
White-line 70 newsback	Used for folding cartons, posters, displays.	100% recycled. Smooth white board.
Clay-coated boxboard	Used for quality cartons.	Very smooth white board with excellent printing surface.
Solid manila board	All carton uses, including food.	White liner and manila back.
Extra-strength plain kraft-type board	Used for hardware, automotive and other machine parts, toys.	Recycled. Available in various colors. Excellent bending ability.
Extra-strength white-lined or clay-coated kraft-type board	Used for heavy objects requiring durability and strength.	Recycled. Top liner is white, back is brown. Available in pastel shades.

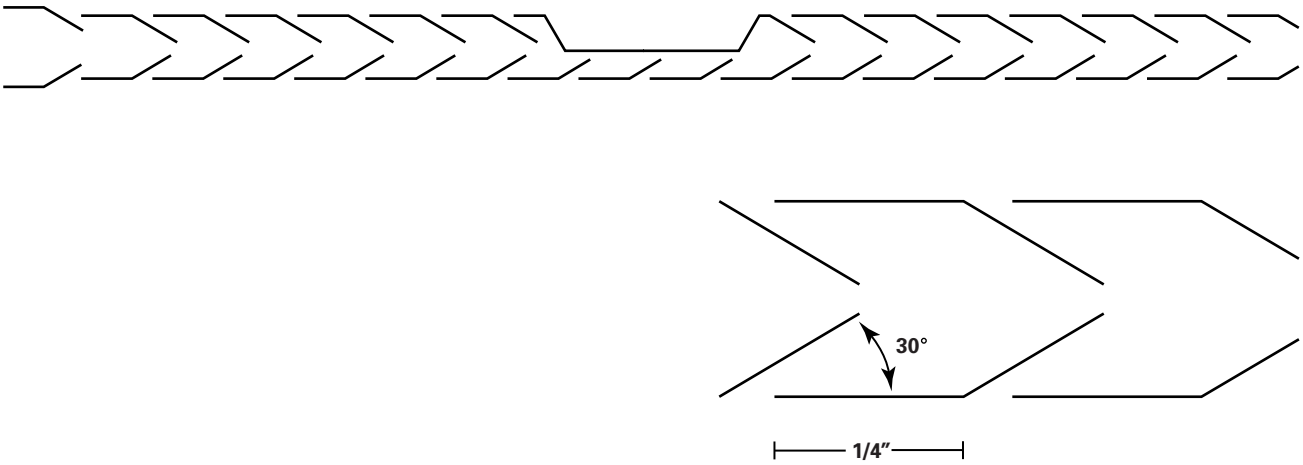
Table 2. BOXBOARDS USED IN PACKAGING: FOURDRINIER MACHINE GRADES

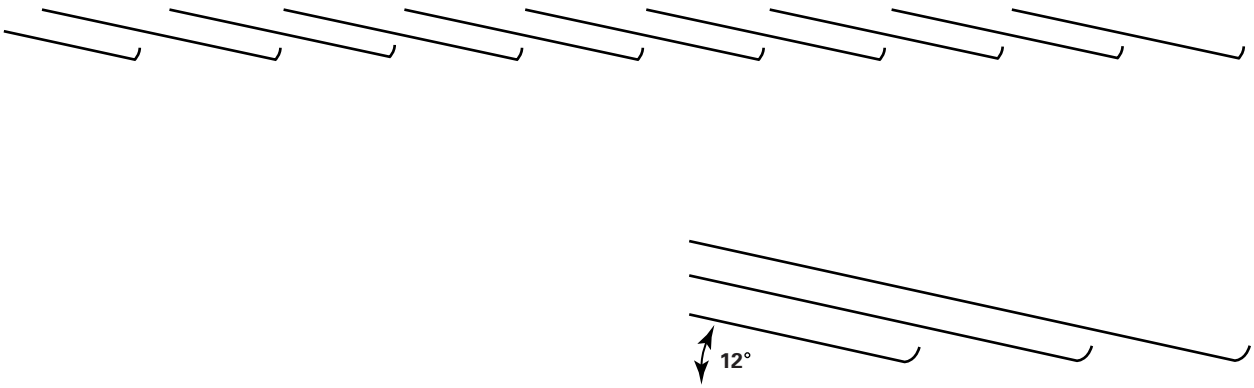
Board	Uses	Chief Characteristics
Uncoated solid bleached sulfate	Waxed, polycoated, or plain frozen-food cartons.	Strong white board. Hard-sized for water resistance and extended service under freezer conditions. Good bending. 100% sulfate pulp.
Clay-coated solid bleached sulfate	Cartons suitable for pharmaceuticals, cosmetics, hardware.	Excellent printability, scoring, folding, and die-cutting; ovenable. Outstanding merchandising appeal. Takes all types of coatings. 100% sulfate pulp.
Clay-coated solid unbleached sulfate	Heavy-duty packages; beverage carriers; folding cartons for food, cosmetics, textiles, housewares.	Strong, moisture-resistant board. Excellent printing surface.

Table 3. PAPERS FOR PRINTING, LABELING, AND DECORATIVE PACKAGING

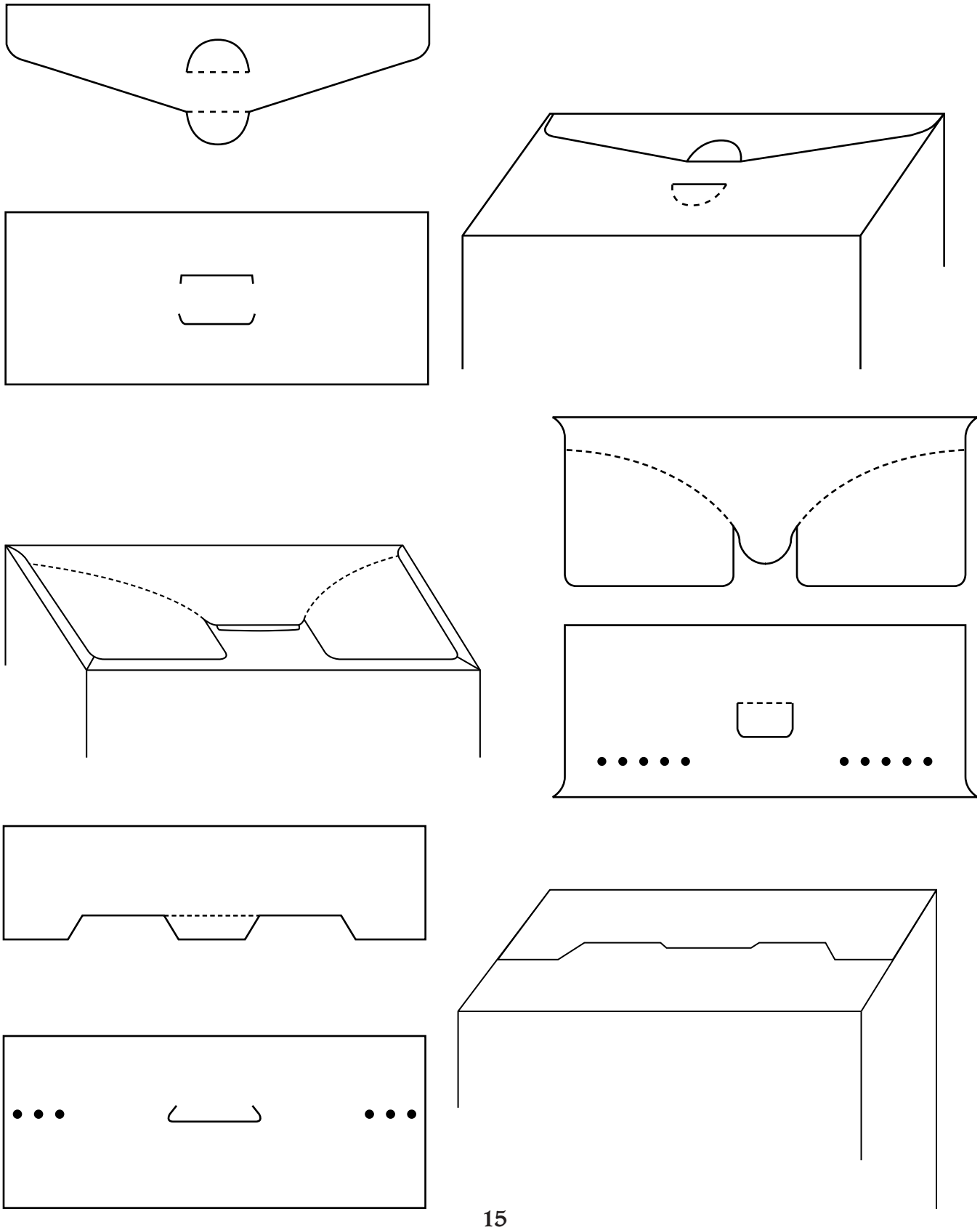
Type	Uses	Characteristics
Flat or dull finish, coated and uncoated	Box wraps for gifts, cosmetics, jewelry.	Smooth, excellent printing surface. Good for embossing.
Glossy finish, supercalendered	Labels, displays, box coverings.	For quality printing. Embosses well.
Cast coated	Box wraps, gift wraps, labels.	Smooth, high gloss. Brilliant white and colors. Excellent printability. Scuff resistant.
Flint	Box and gift wraps, labels for cosmetics, gifts.	Extremely fine-quality surface, high gloss. Wide color range.
Friction glaze	Box covering. Good appearance at low cost.	High glaze. Scuff resistant. Economical.
Metallic-finish Argentine	Box wraps and overwraps, luxury items. Gift packages.	Has decorative effect of foil but is less costly. Lacquer lends gold or colored look.
Foil	Decorative packaging and labels.	Aluminum laminated to paper backing. Wide range of brilliant metallic colors. Expensive.
Gravure printed	Boxes, displays, labels, platforms.	Printed with metallic powders mixed with lacquer.
Half-fine, half-fine embossed	Specialty boxes for cosmetics.	Embossed, continuous metallic surface. Wide color range. Elegant, rich.
Pyroxylin	Box coverings, food wrappers for high-quality items.	Metallic tones. Bronze, aluminum, or copper ground into pyroxylin lacquer.
Vacuum metallized	Labels for canned goods, batteries, wrappers for food and confectionary products.	Produced by vacuum metal-vapor deposit method.
Flock	Platform coverings, linings for gift boxes.	Flock of cotton adhered to surface of paper to create soft, velvety look.
Foam paper	Protective cushioning for wraps, platforms, pads, box coverings.	Foamed polystyrene sheet laminated to paper. Lustrous finish; wide range of colors.
Glitter	Box coverings, platforms.	Specks of metal embedded in paper surface.
Iridescent or pearlescent coating	Luxury items, wraps, platforms.	Mother-of-pearl effect.
Tissue	Used for jewelry, flowers, fruit, hosiery. Specially treated and designed for visual appeal.	Treated for texture, water, resistance, printability.
Glassine	Laminated trays for candies and other food products.	Grease and oil resistant.
Parchment	Wrapper, liner for greasy or oily items.	Water resistant, high wet strength. Lacquered or waxed base.
Polyethylene and saran-coated kraft	Widely used for food products. Cereal and cracker cartons, bread wraps.	Excellent barrier to moisture.

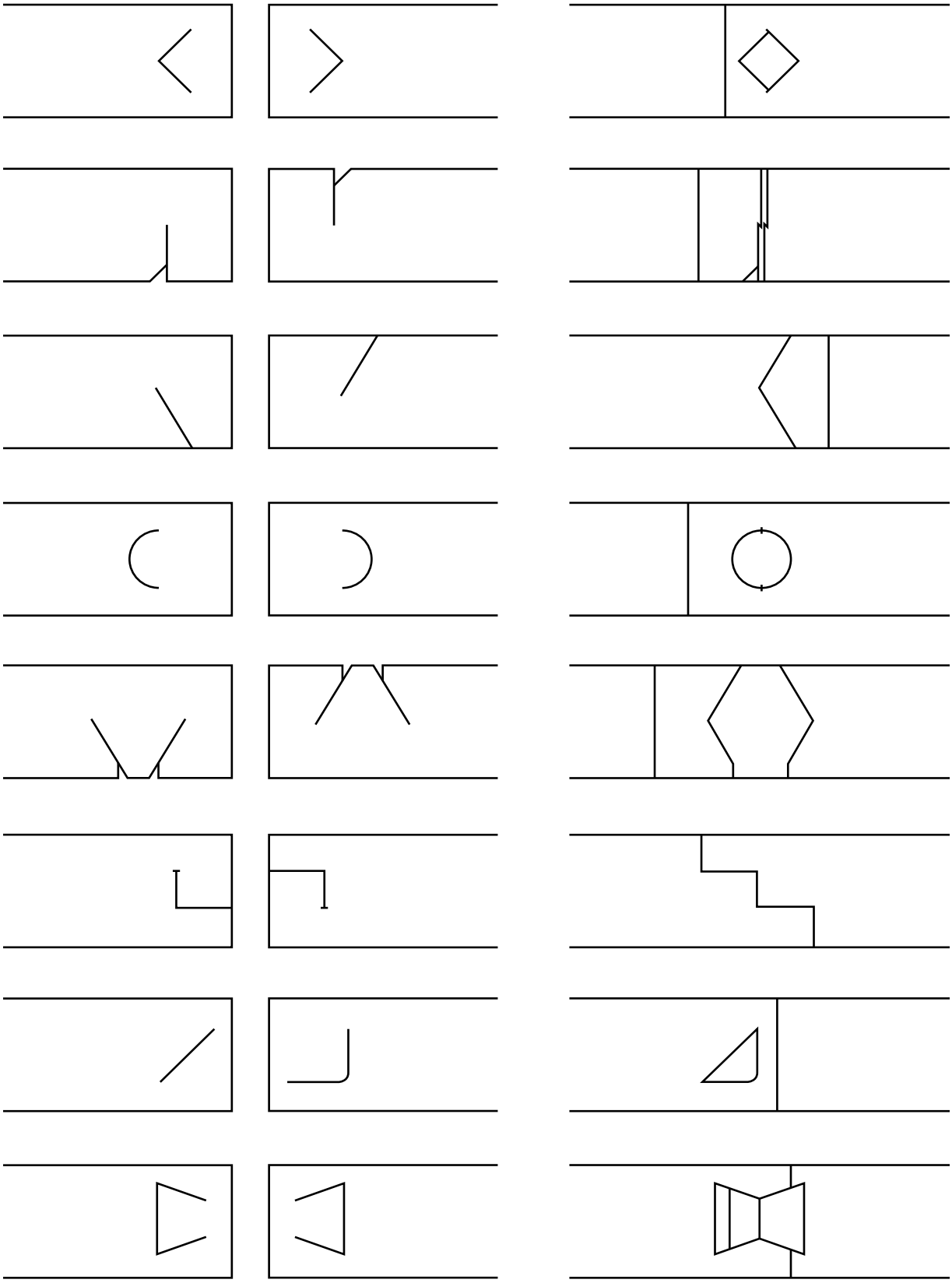


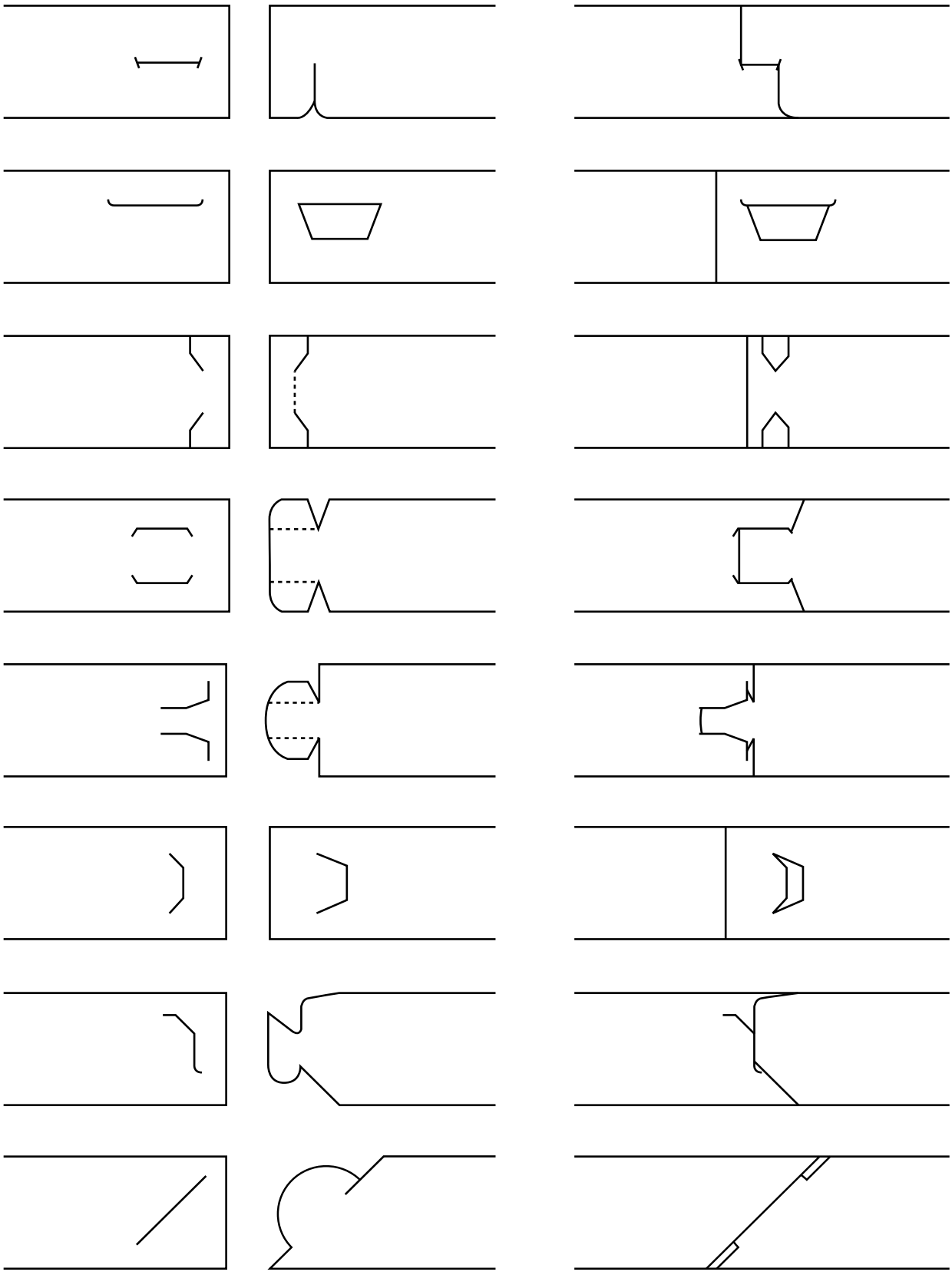




Perforation length depends on the thickness of the card stock.

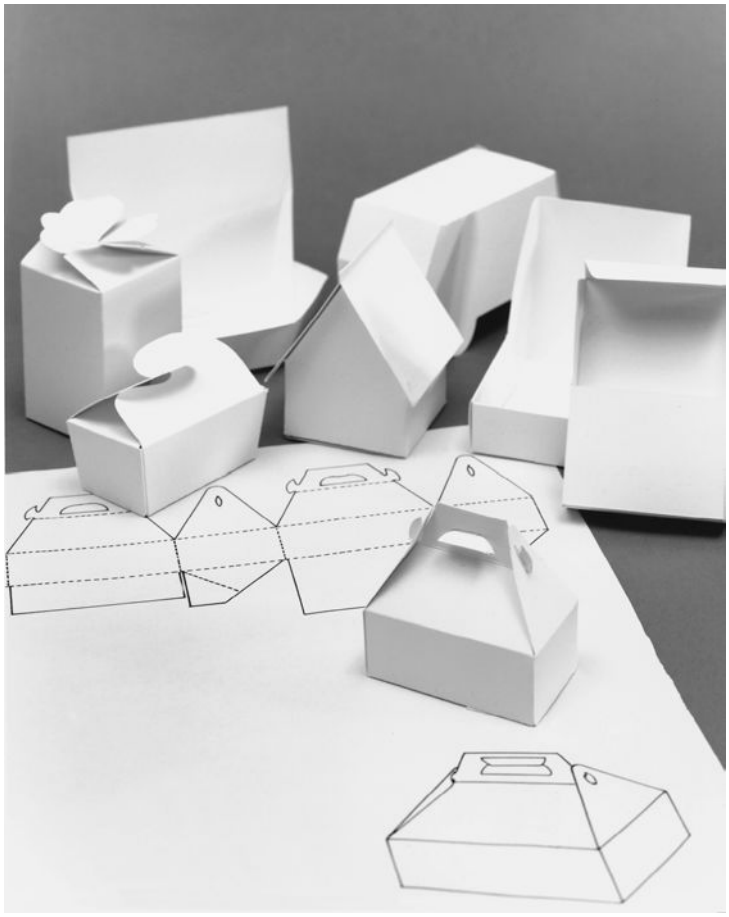






2

The Folding Carton



The cracker barrel and the flour sack were once the standard packages in the grocery trade. Today this method of "bulk packaging" has given way to a system in which small units are produced at manufacturing plants. The product is placed in paper containers made from a wide variety of boards.

Once in the hands of the consumer, a product may not be used all at once but only partially consumed. The package therefore must allow the consumer to remove a portion of the product without destroying the container. Dispensing of the contents over time is an important function of packages. Finding ways to protect and preserve products for future use is a primary concern of packagers.

With the advent of new methods of marketing and merchandising, packages now must be designed to be selected by the consumer without the help of a sales clerk. This development has given manufacturers and dealers an opportunity to enhance their products through the graphic and structural design of the package.

The shape, size, proportions, and material (board) of packages depend on the size and type of product they contain. To most people, the folding carton is the most familiar type of paper container. It is economical in terms of both material and production costs. Being collapsible, it takes up minimal space during shipment or storage. The versatility of the folding carton adds value and sales appeal to the product. The most advanced printing, embossing, and decorating techniques can be utilized to enhance the carton's appearance.

HISTORY OF THE FOLDING CARTON

The annals of invention are crowded with stories of fortunate accidents. Packaging is no exception. It happened in 1879 in the Brooklyn factory of Robert Gair, a successful printer and manufacturer of packaging materials. Gair was inspecting a printed seed package that had been accidentally slashed by a printing plate that had been improperly positioned on the press.

The revelation came to him: Why not create a die ruled for cutting and scoring a blank (paperboard) in a single impression? The idea worked, and the first machine-made folding carton was born.

In 1896 the first cartons of crackers appeared in stores, with a sealed inner bag to keep the product fresh. National Biscuit Co. was the first U.S. manufacturer to use this new packaging medium. The brand name was Uneeda, a name that is still in use.

By 1923 there were 200 manufacturers of folding cartons. By 1980 the number had grown to about 700 plants, which together use three and a half million tons of paperboard annually.

There are many variations in the construction of folding cartons. The modifications that can be made in the basic pattern are limited only by the designer's imagination.

Today folding cartons are precision-made. Low-cost packages are supplied in *knock-down* form and are known as *blanks.* When assembled, they become three-dimensional rigid packages. They can be filled by high-speed automatic, semiautomatic, or hand-operated equipment. Knock-down containers lend themselves to various types of marketing and retailing systems, notably those that handle food, gifts, pharmaceuticals, cosmetics, toys, hardware, and housewares.

THE TRAY-STYLE CARTON

One of the basic types of folding carton is the *tray.* In one type of tray-style carton, a solid bottom is hinged to wide side and end

walls. The sides and ends are connected by a flap, hook, locking tab, or lock. These cartons have a variety of cover and flap parts extending from the walls and sides of the tray.

In another type of tray carton, two pieces, one slightly smaller than the other, form the base and cover of a two-piece telescoping box. Typical tray packages include cigarette cartons, bakery trays, ice cream cartons, pizza cartons, and garment carriers.

THE TUBE-STYLE CARTON

Another basic type of folding carton is the *tube.* The body of the tube-style carton is a sheet of board that is folded over and glued against its edges to form a rectangular sleeve. It has openings on the top and bottom that are closed with flaps, reverse or straight tucks, and locks.

Tube-style cartons give the product fully enclosed protection. They are used for bottled products, cosmetics, and pharmaceuticals. Often a window is added so that the consumer can see the product. Many unusual tube types and styles are available, including contoured, triangular, octagonal, and even rounded shapes. The following pages present a variety of folding-carton patterns. They can be constructed in any size from board or sheet plastic (acetate).

COSMETICS, PHARMACEUTICALS, AND PROMOTIONAL PACKAGING

The cosmetics industry was the first to effectively use packaging, and is still inspiration for the most creative types of packaging.

The history of cosmetics goes back thousands of years. The Bible describes the practice of anointing the head and body with oil. Primitive tribal symbols applied to the face and body were used to frighten enemies in various cultures in Africa, North and South America, and Oceania. Another traditional use of cosmetics is to attract members of the opposite sex. (The most famous figure associated with this practice is Cleopatra, the last queen of Egypt, who was renowned for her skill in making and applying cosmetics.) The ancient Greeks and Romans were great users of all types of cosmetics—hair dyes, creams, makeup, and the most important toiletry, soap, which was invented around 100 A.D. In the seventeenth century Queen Elizabeth I used dyes (red) for her hair as well as fragrances; some of the most well-known historical figures of this period never bathed, but used perfumes and rosewater to counteract body odors and dirt.

The wholesale manufacturing of cosmetics and toiletries began in France during the reign of the "Sun King," Louis XIV (1643-1713). During the Napoleonic era in the early 1800s, it became a major industry.

Cosmetics packages have the look of luxury and elegance. The standard cosmetics container is a folding or set-up carton embellished with rich colors, textures, and graphics. It attempts to portray the consumer as potentially beautiful, desirable, and elegant. From the marketing point of view, the cosmetics package is selling hope.

Pharmaceuticals are another important area for the packaging industry. There are about 1,000 drug-manufacturing companies in the United States. Pharmaceuticals packaging uses all types of packaging materials, including paper, board, and plastics.

Over-the-counter drugs must have sales appeal, and packaging plays an important role in providing that appeal. The folding carton encloses a glass or plastic container for the medication. The carton provides protection as well as serving as a promotional tool.

Pharmaceuticals packaging involves several factors, including moisture and oxygen control to preserve the potency of the medication; volatility and light protection to protect the drug against exposure to harmful ultraviolet rays; and protection against heat, which can cause deterioration of the product. Safety also plays a significant role. Many items (e.g., surgical dressings, injectables) must be kept sterile until they are used. The packaging must also be childproof and tamperproof.

The requirements for packaging of cosmetics and pharmaceuticals are very similar. In both cases manufacture and distribution is strictly regulated by the Food and Drug Administration.

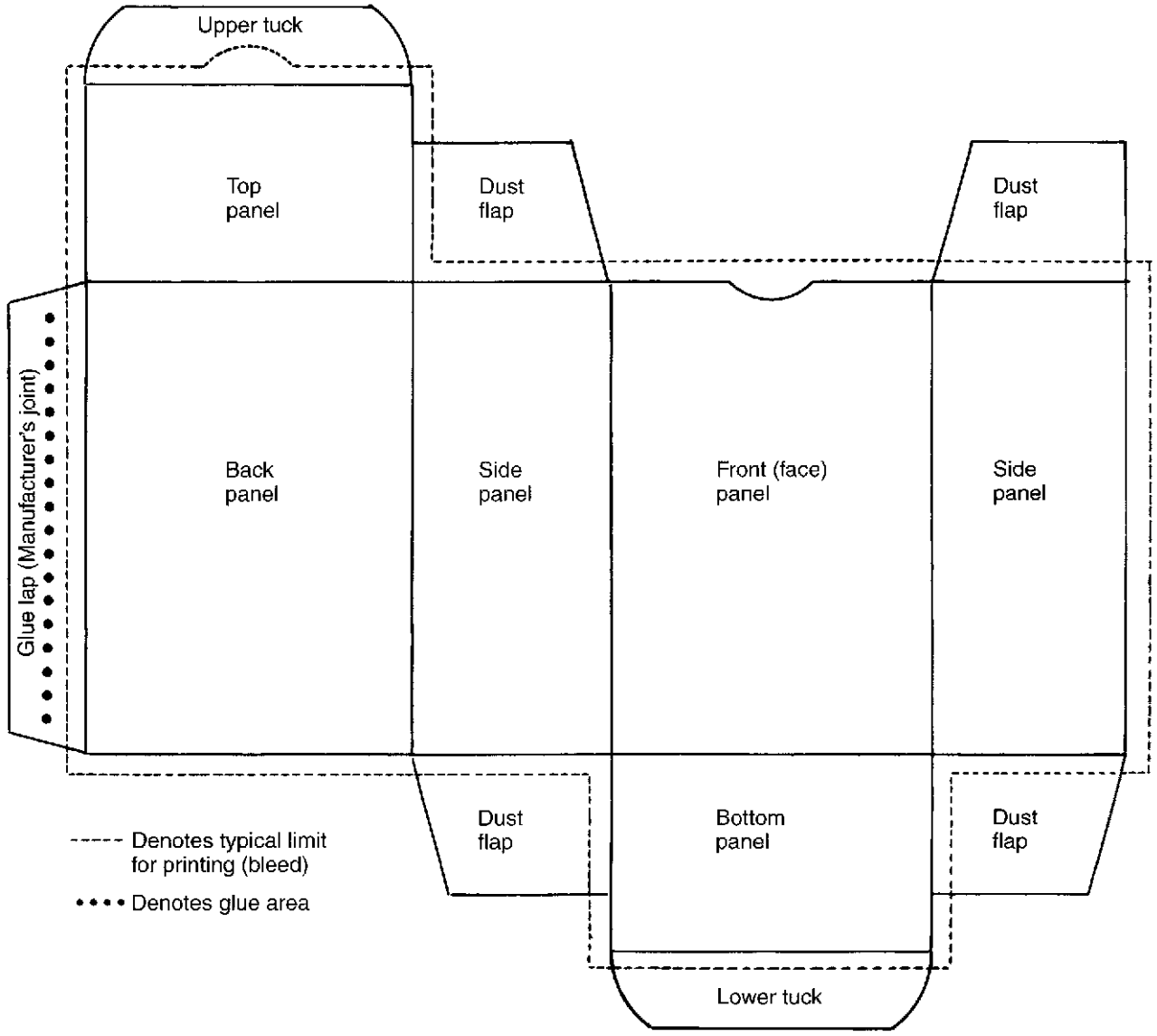
Promotional packaging was originally used by the pharmaceuticals industry for the introduction and promotion of new products. The packages were sent to physicians. Gradually these packages became a total-communication effort. In addition to product samples, the package contained descriptive literature, reply cards, and videotapes. Manufacturers of other products and services soon followed the lead of the pharmaceuticals industry, and promotional packaging is now used by all major industries. Examples of mailers and other imaginative promotional packages are shown on the following pages.

UNUSUAL APPROACHES TO CARTON AND BOX CONSTRUCTION

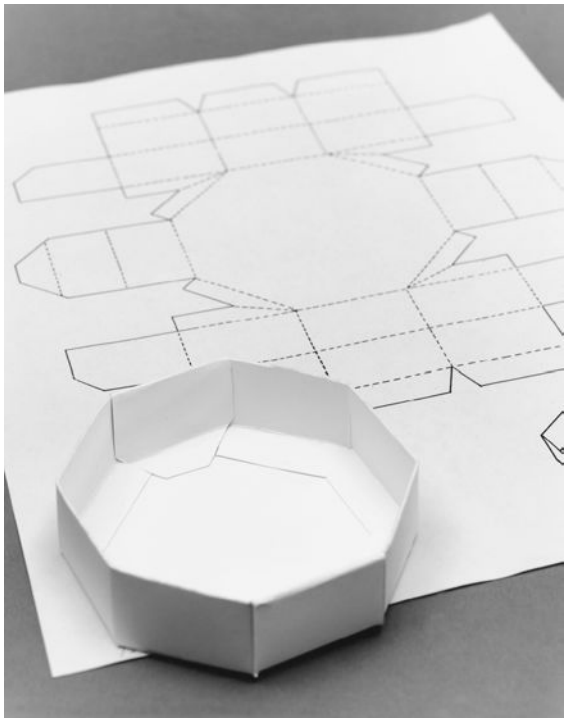
Designers today are increasingly interested in technology. Computer-aided design, for example, enables them to create or alter concepts in minutes. Such technological advances have reduced the need for handwork and special skills. However, student and professional designers alike have a tendency to cling to familiar methods and skills, which give them a feeling of self-fulfillment.

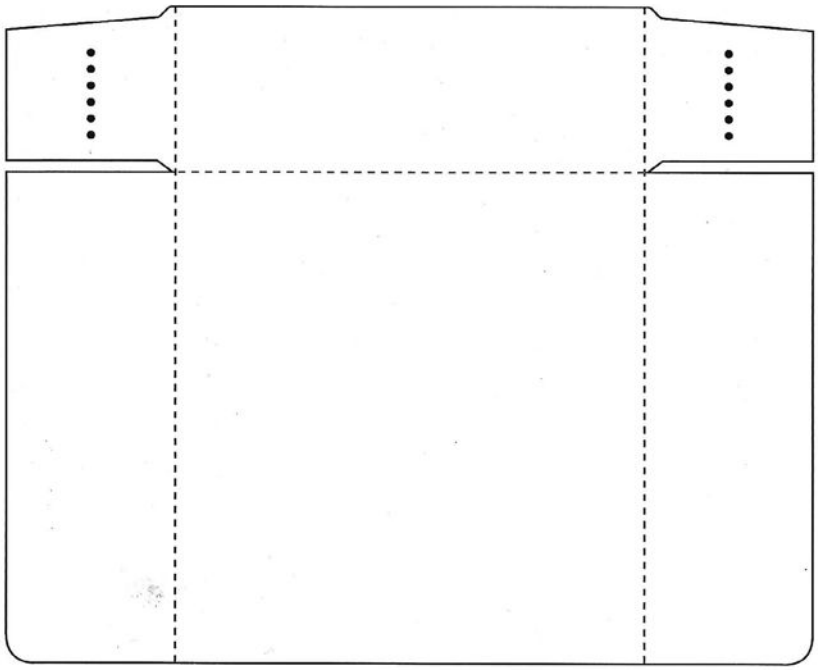
Like new technologies, economic factors appear to limit the possibilities for design, yet they can actually stimulate innovation. An example is the revitalization of folding-carton design that occurred as a result of the prohibitive cost of set-up boxes and the increasing cost of hand labor.

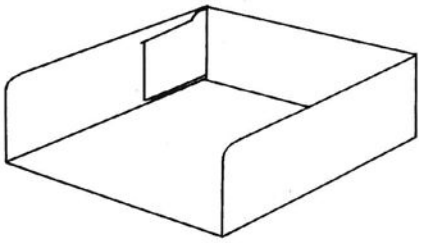
Many of the following pages present examples of structural experiments. They reflect the exciting experimental work being done in schools of design. Innovations in design like those shown here can strongly influence the marketing of a product, often surpassing even the expectations of the client.


Upper tuck
Top panel
Dust flap
Dust flap
Glue lap (Manufacturer's joint)
Back panel
Side panel
Front (face) panel
Side panel
Dust flap
Bottom panel
Dust flap
Lower tuck
Denotes typical limit for printing (bleed)
Denotes glue area

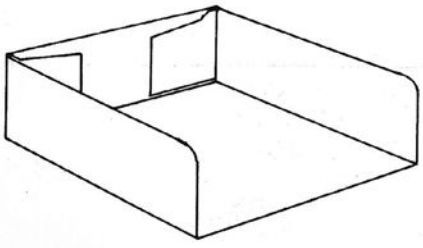
Trays

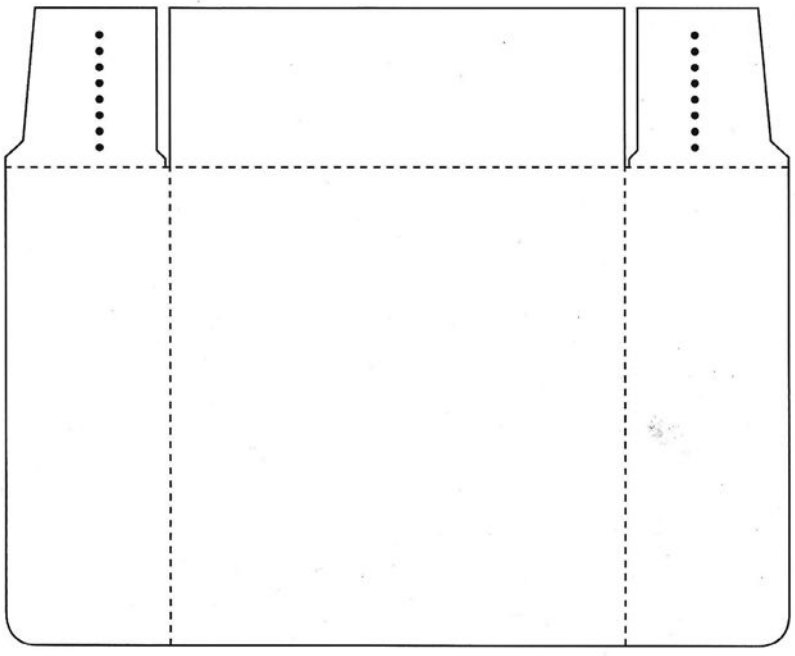


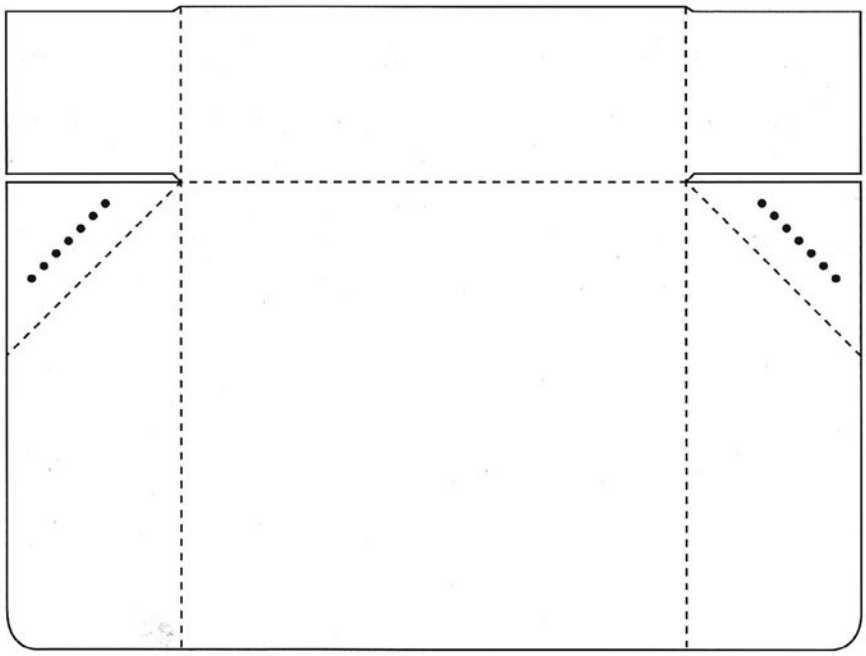


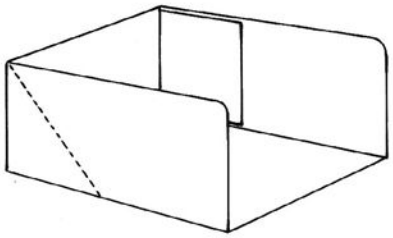


open-ended tray, variation

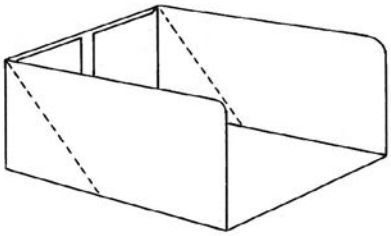


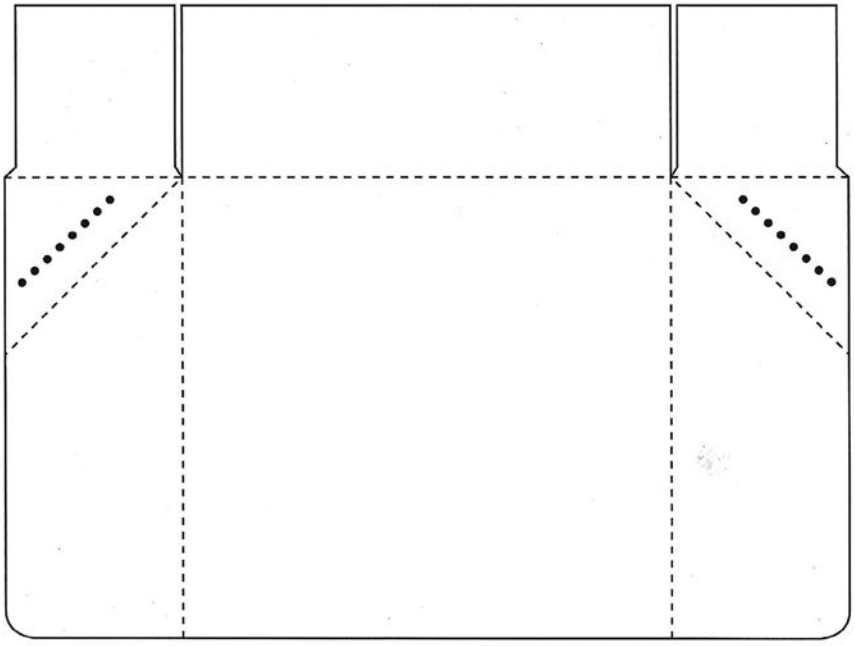


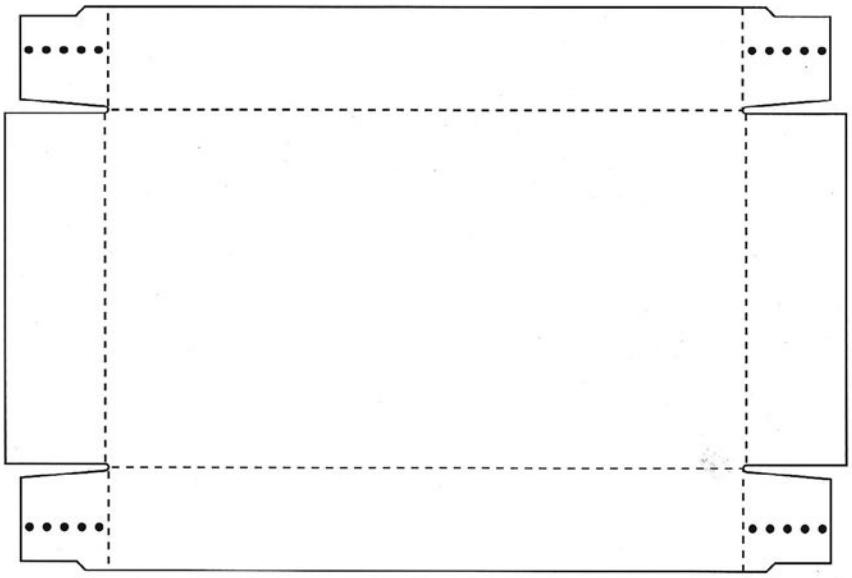


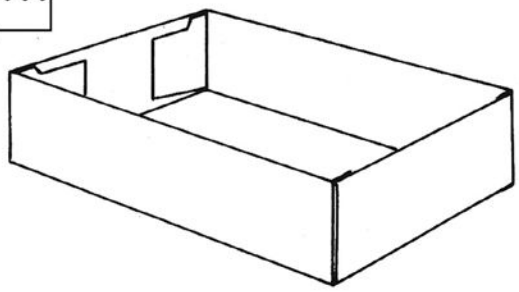


Open-ended collapsible tray—variation

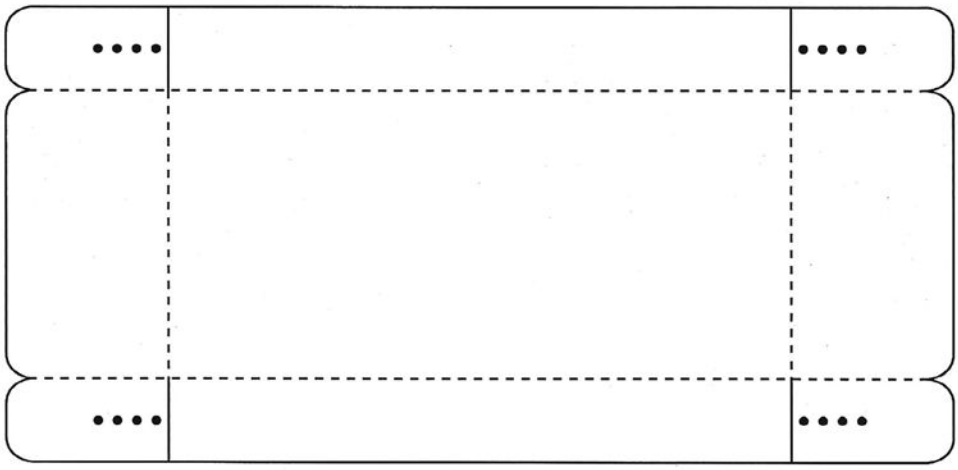


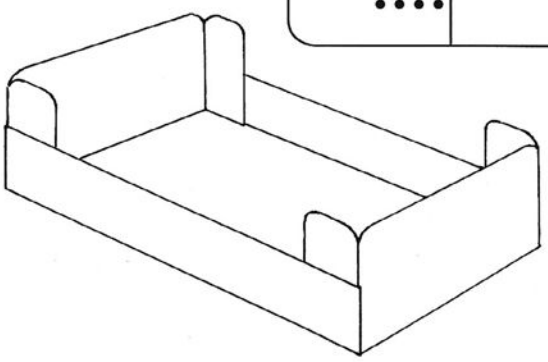




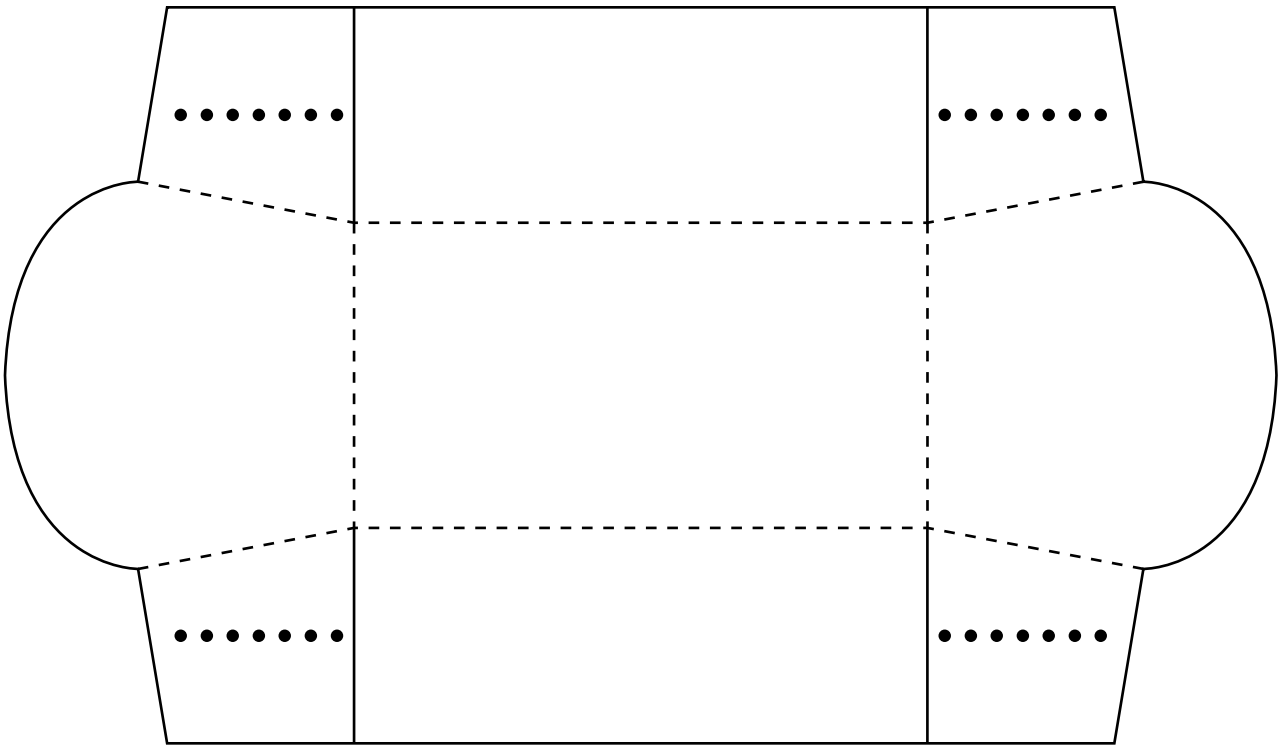


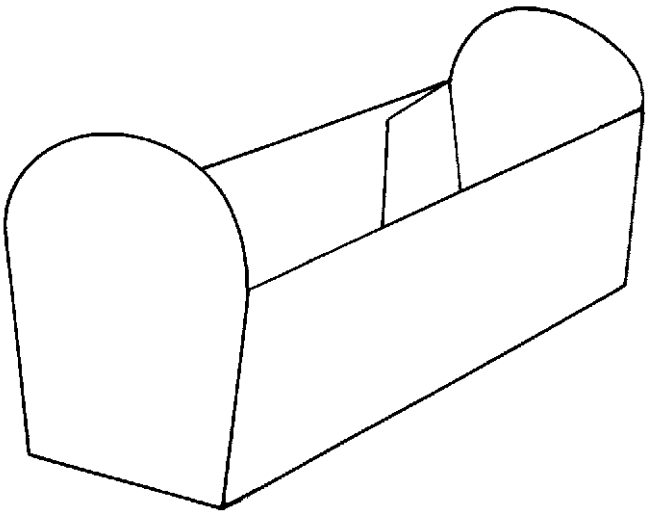
Glued-up tray with protective end panels

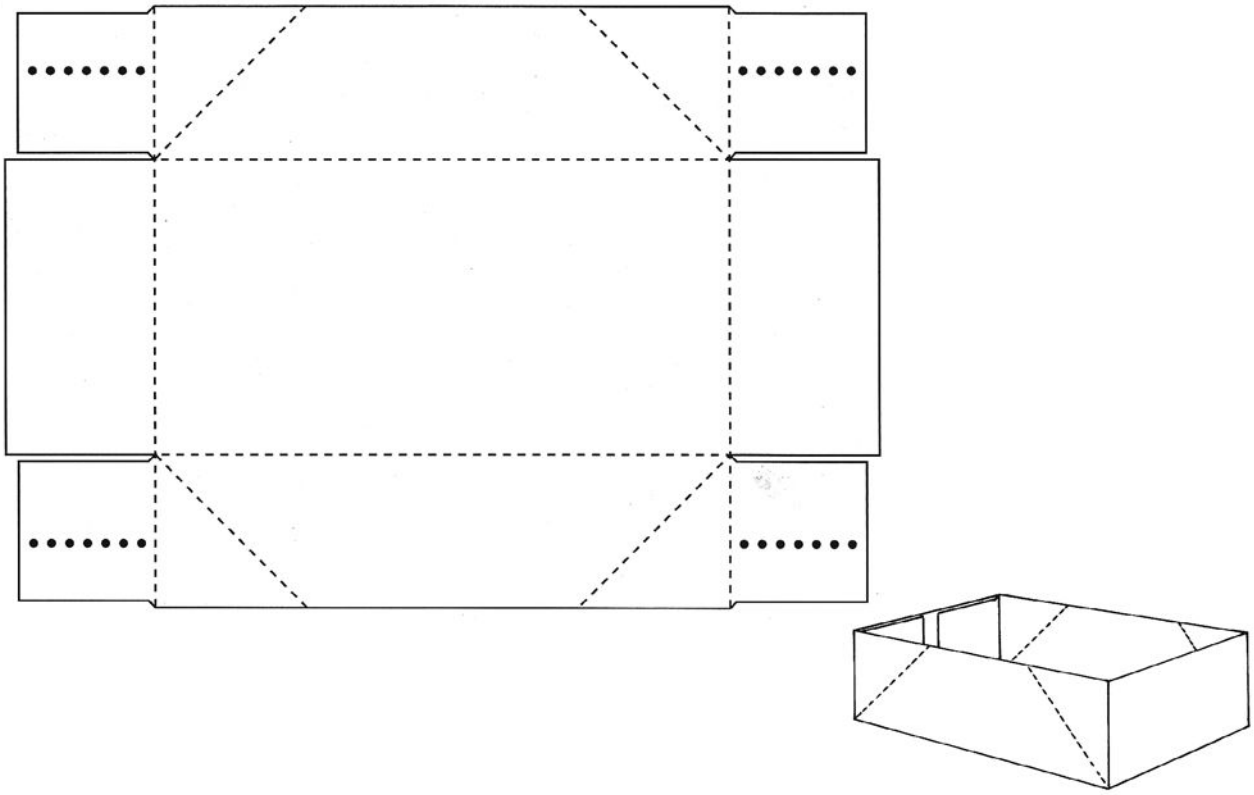




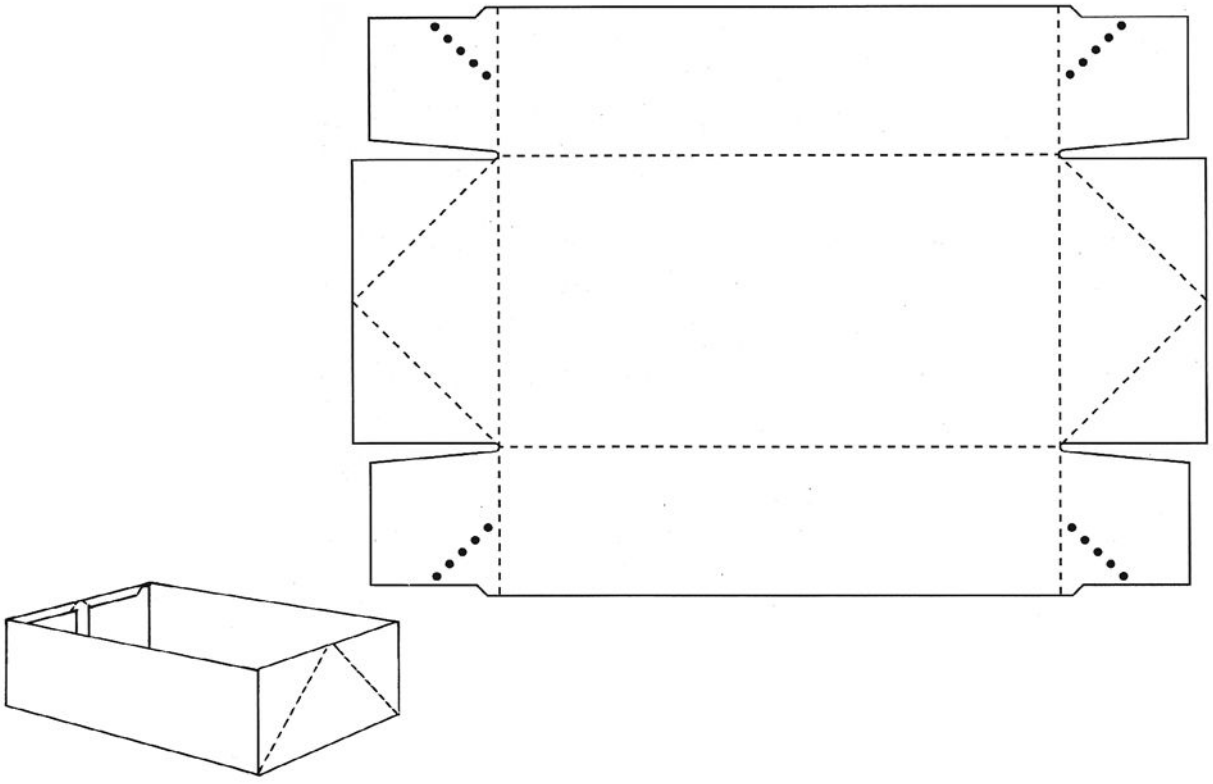
GLUED-UP TRAY WITH PROTECTIVE END PANELS AND TAPERED SIDE PANELS

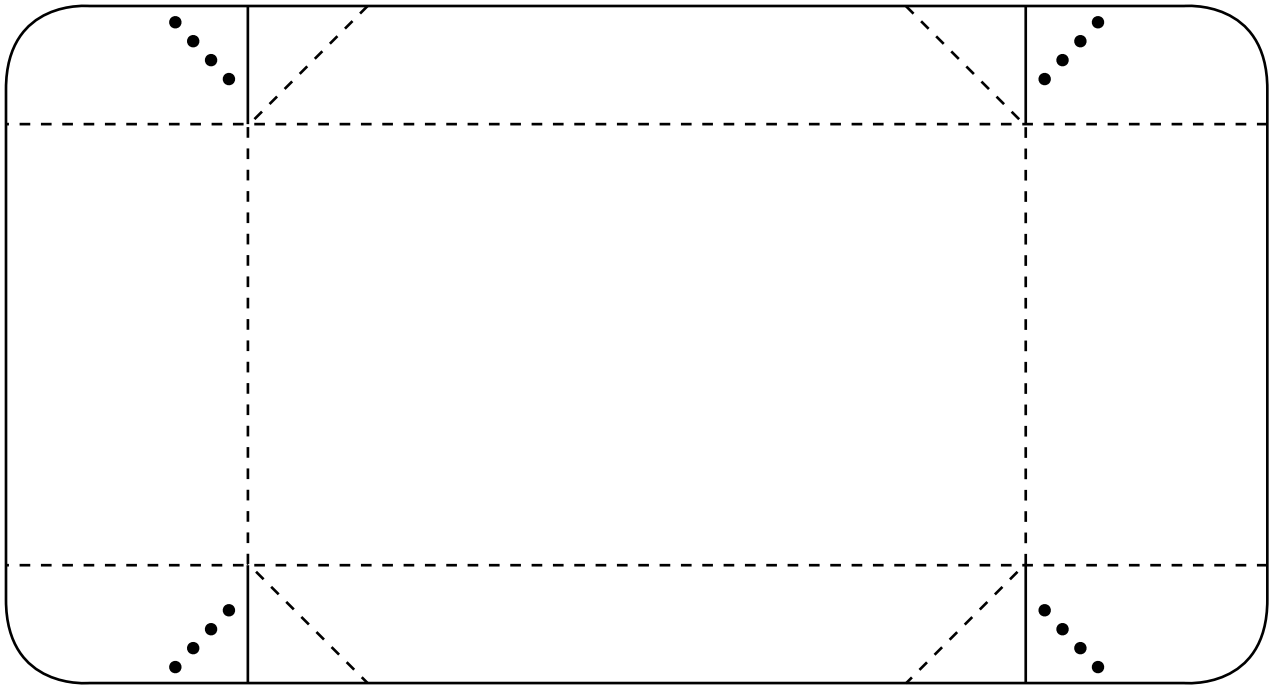


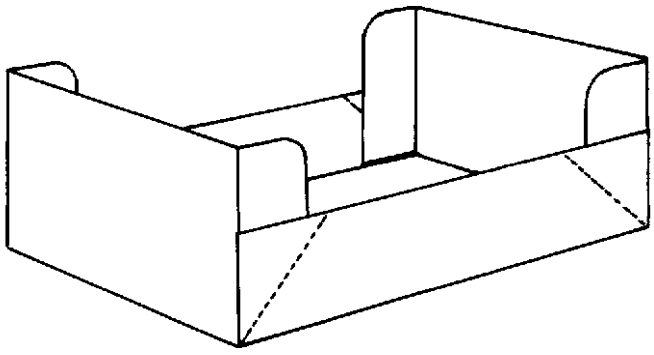


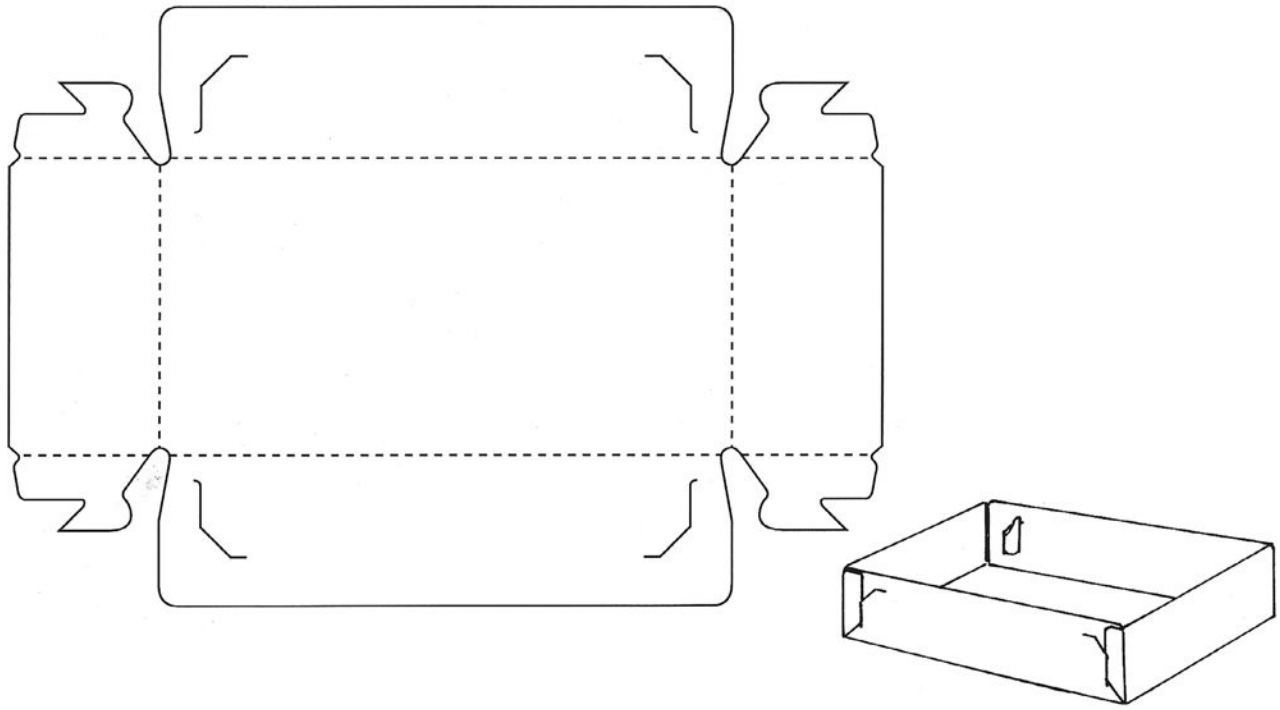


Four-corner brightwood-style tray

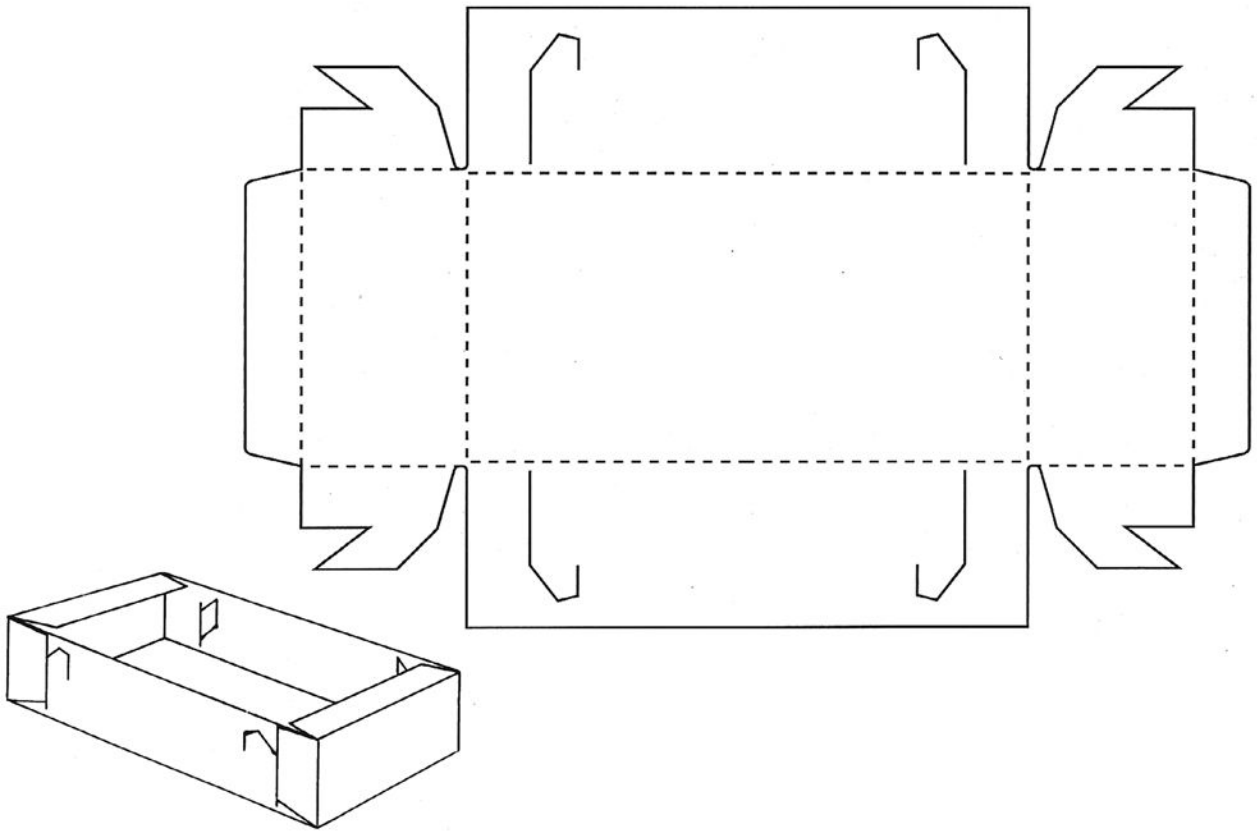




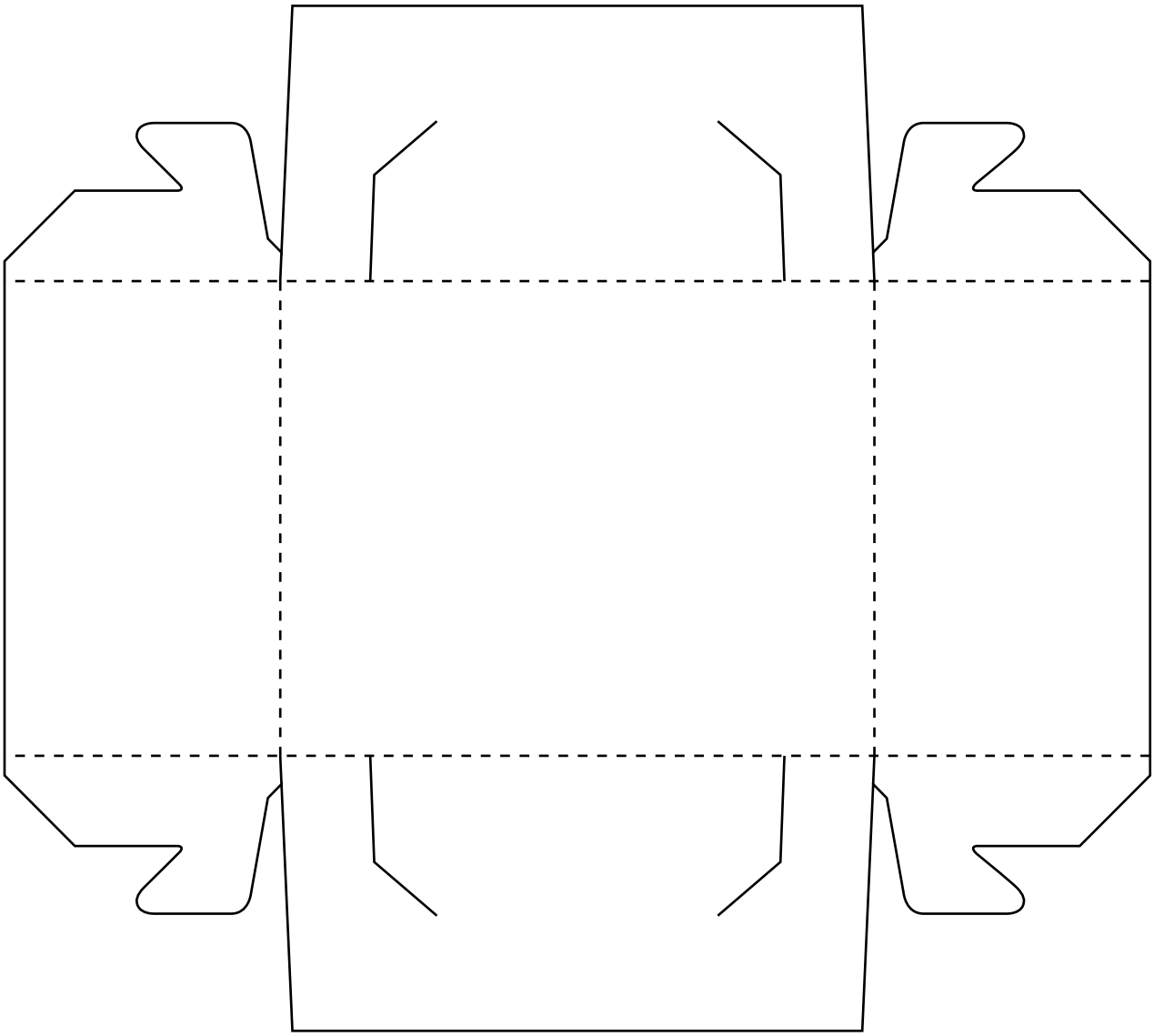


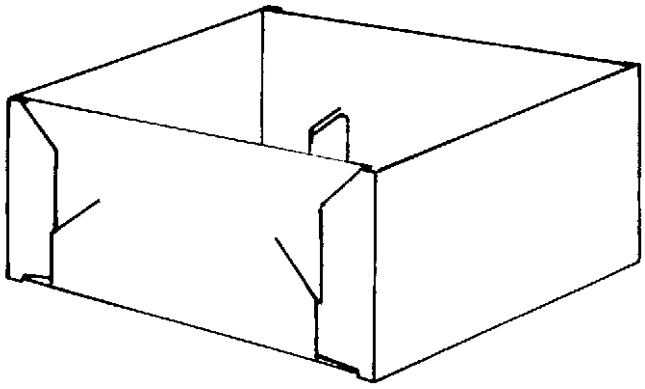


Corner lock tray with top labeling flaps

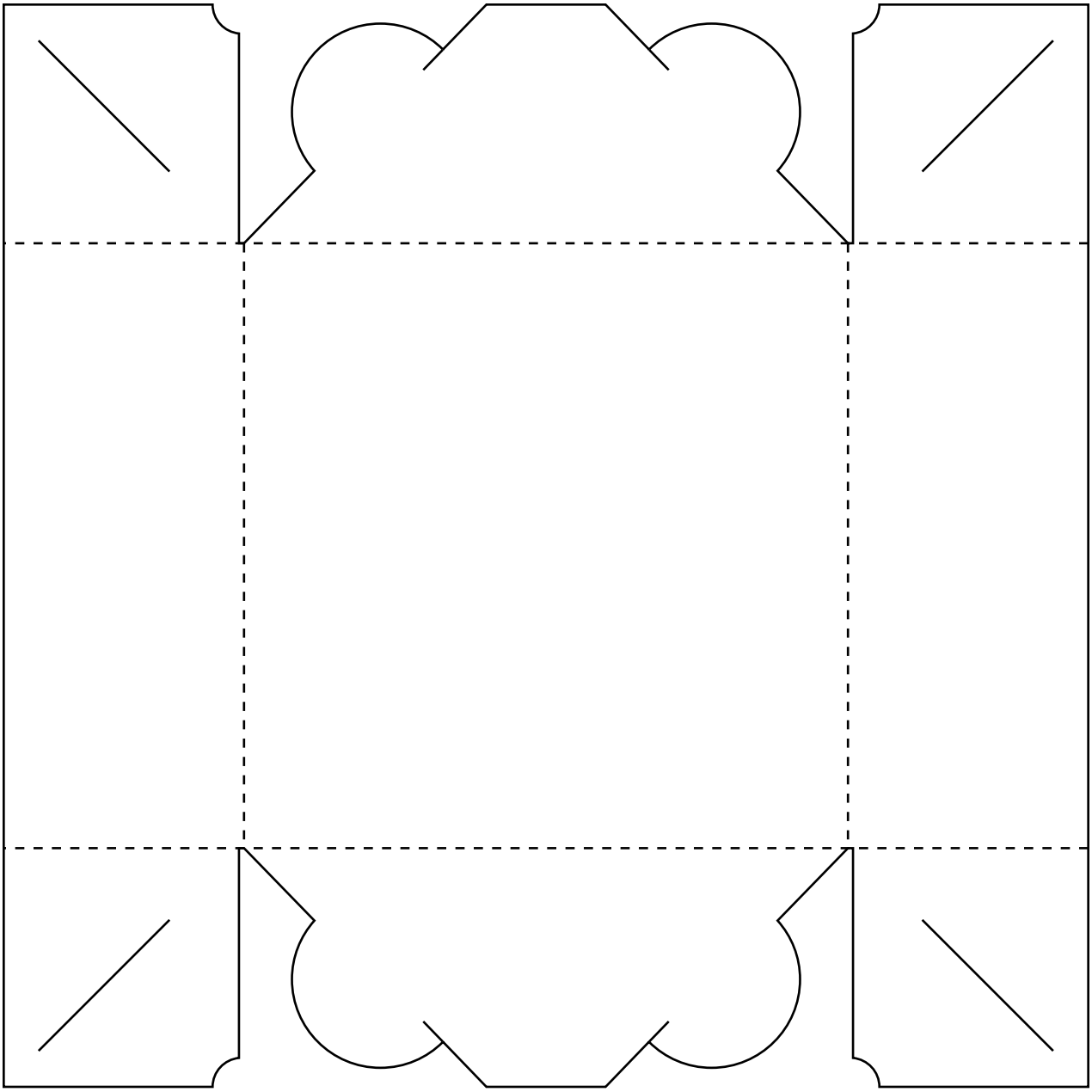


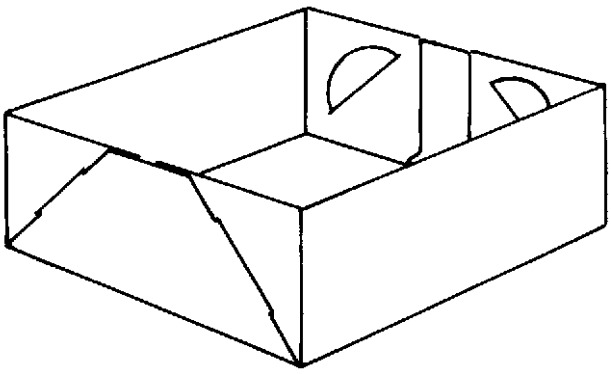
STRIPPER LOCK TRAY

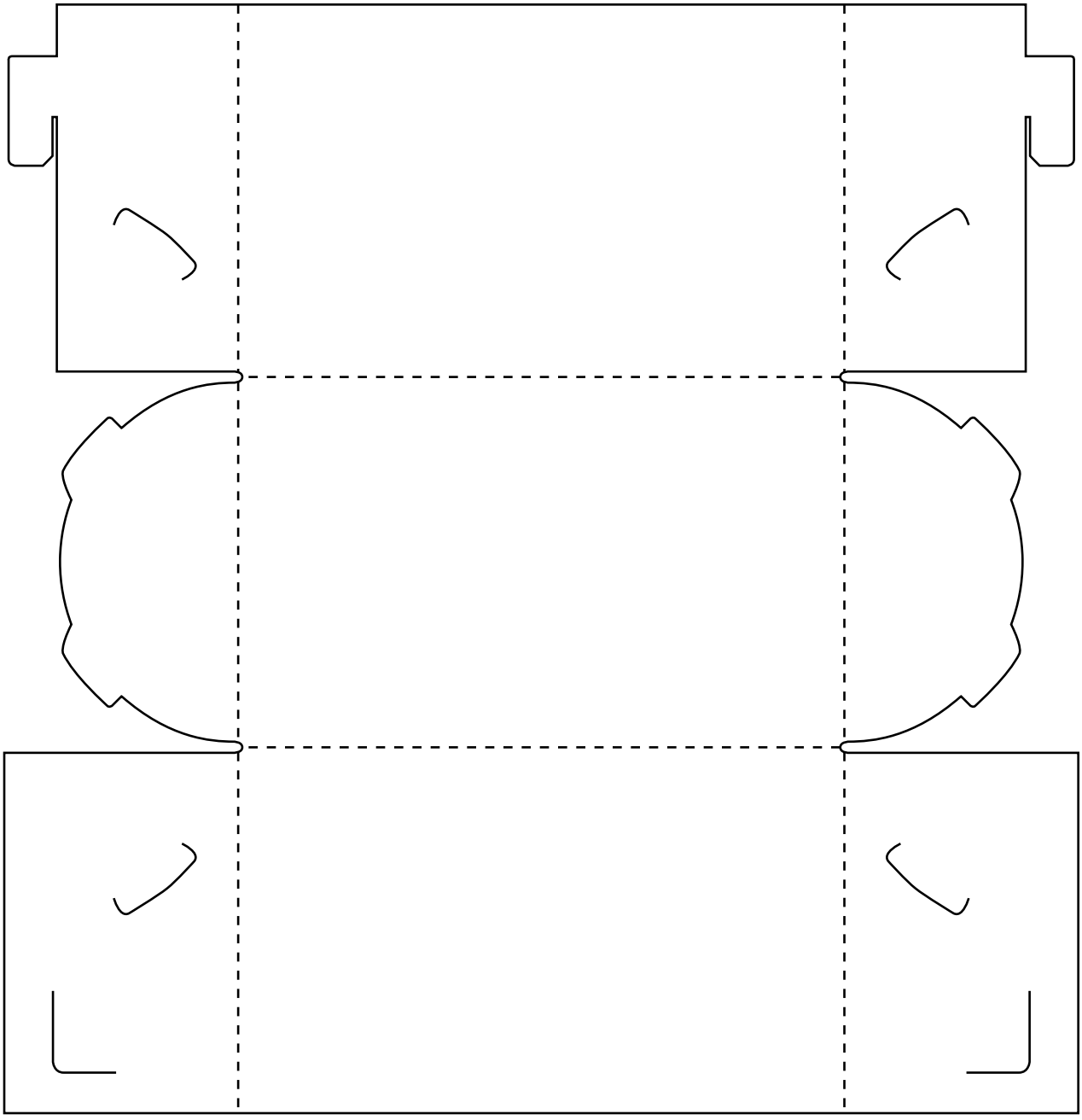


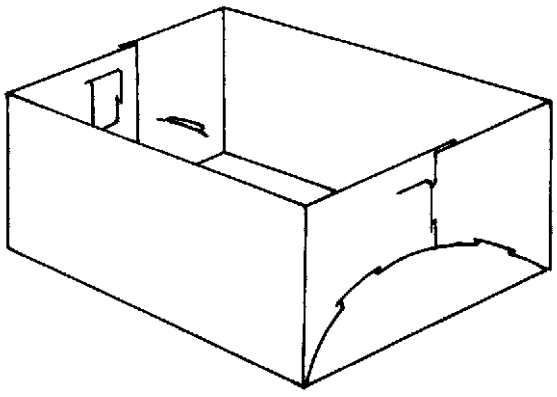


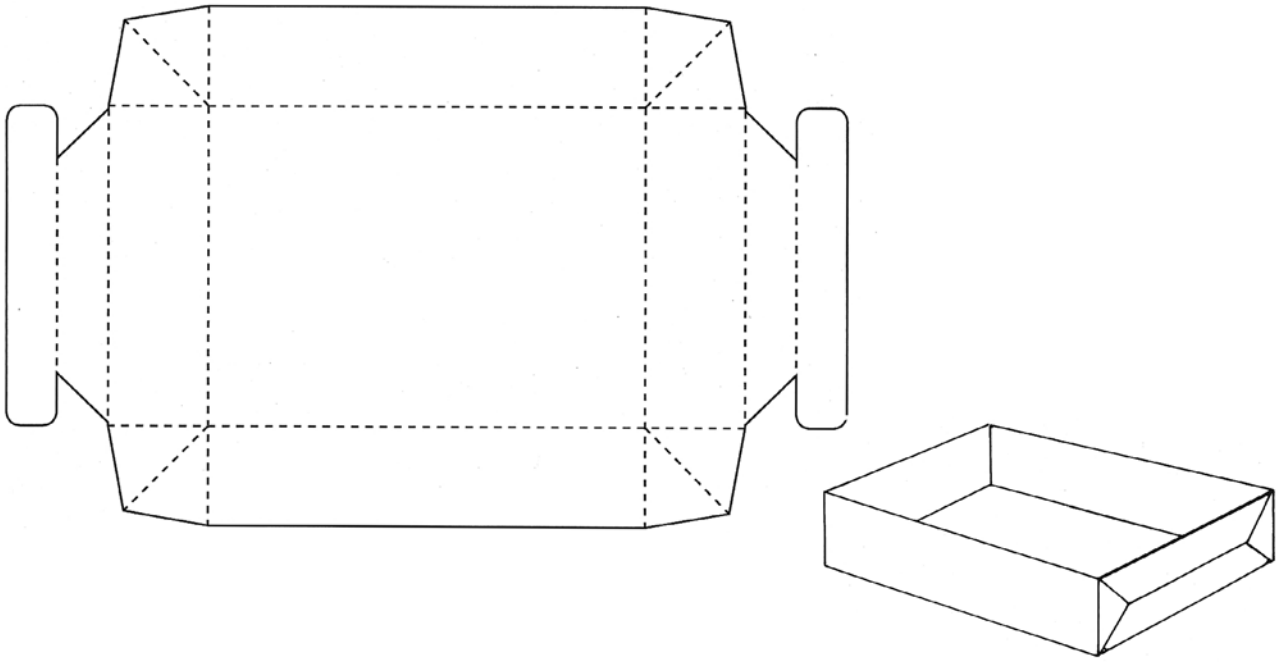
ANCHOR LOCK TRAY



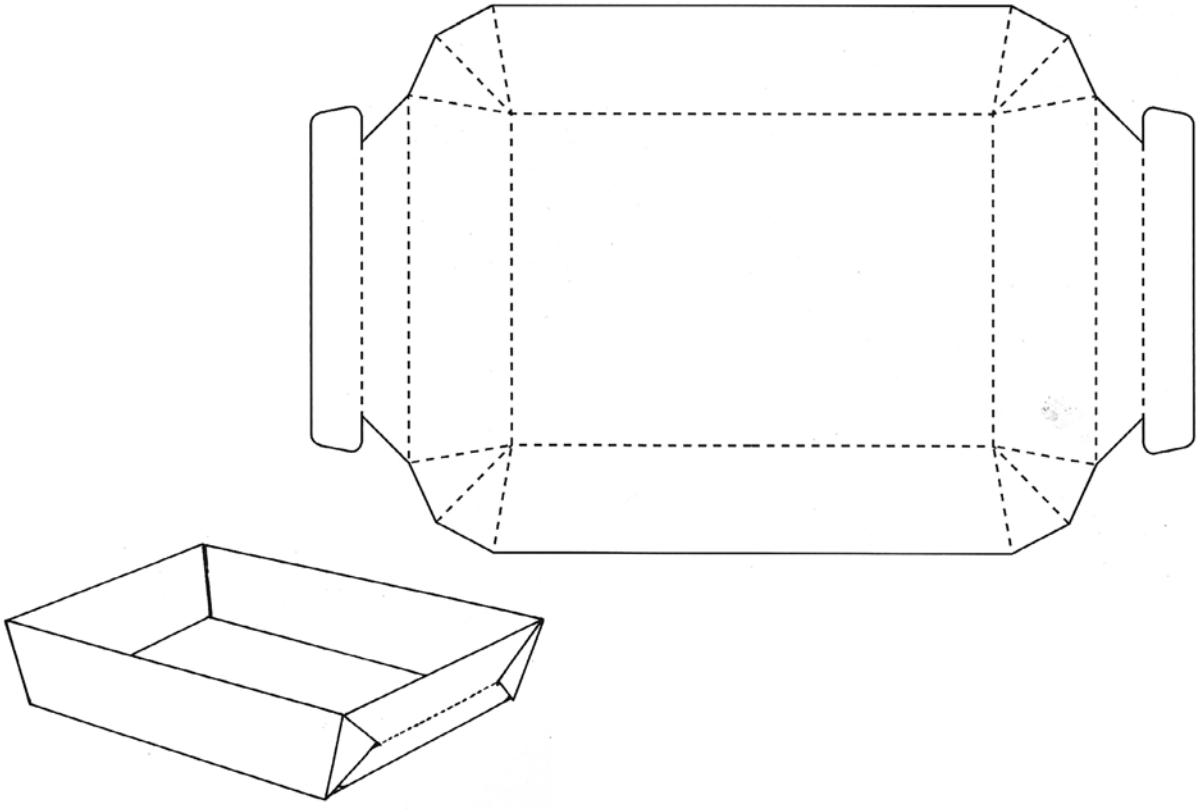




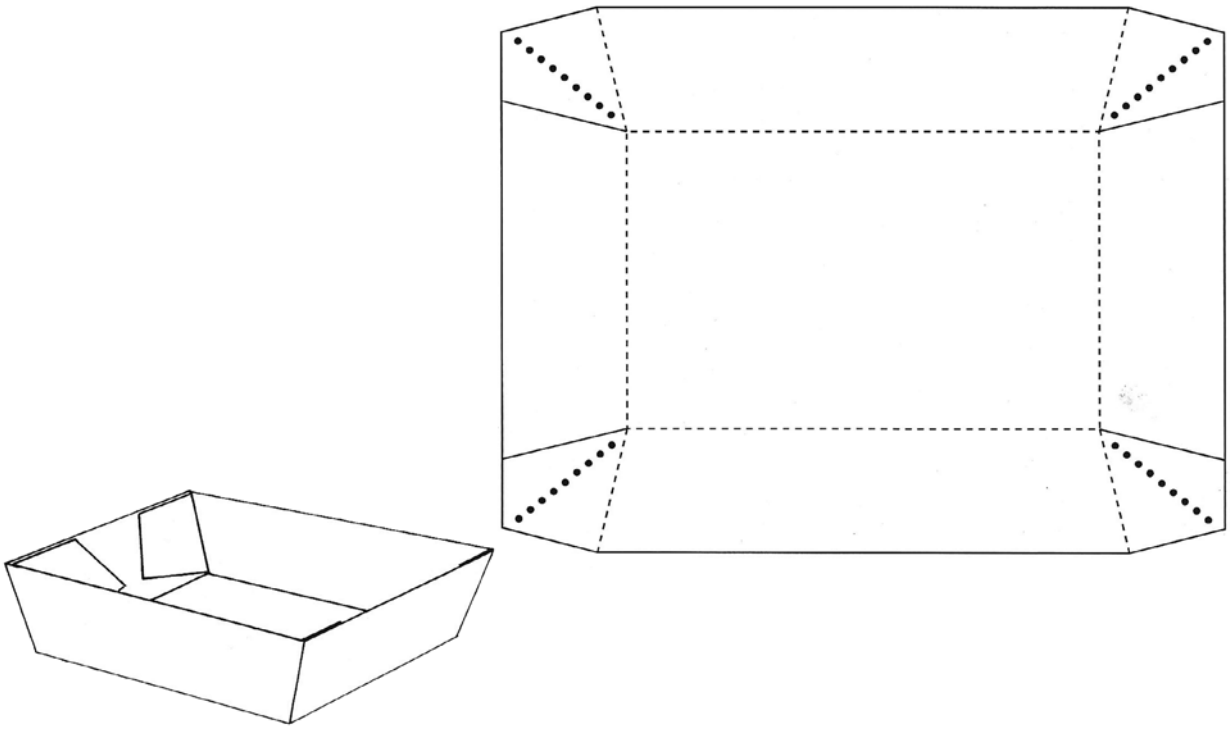




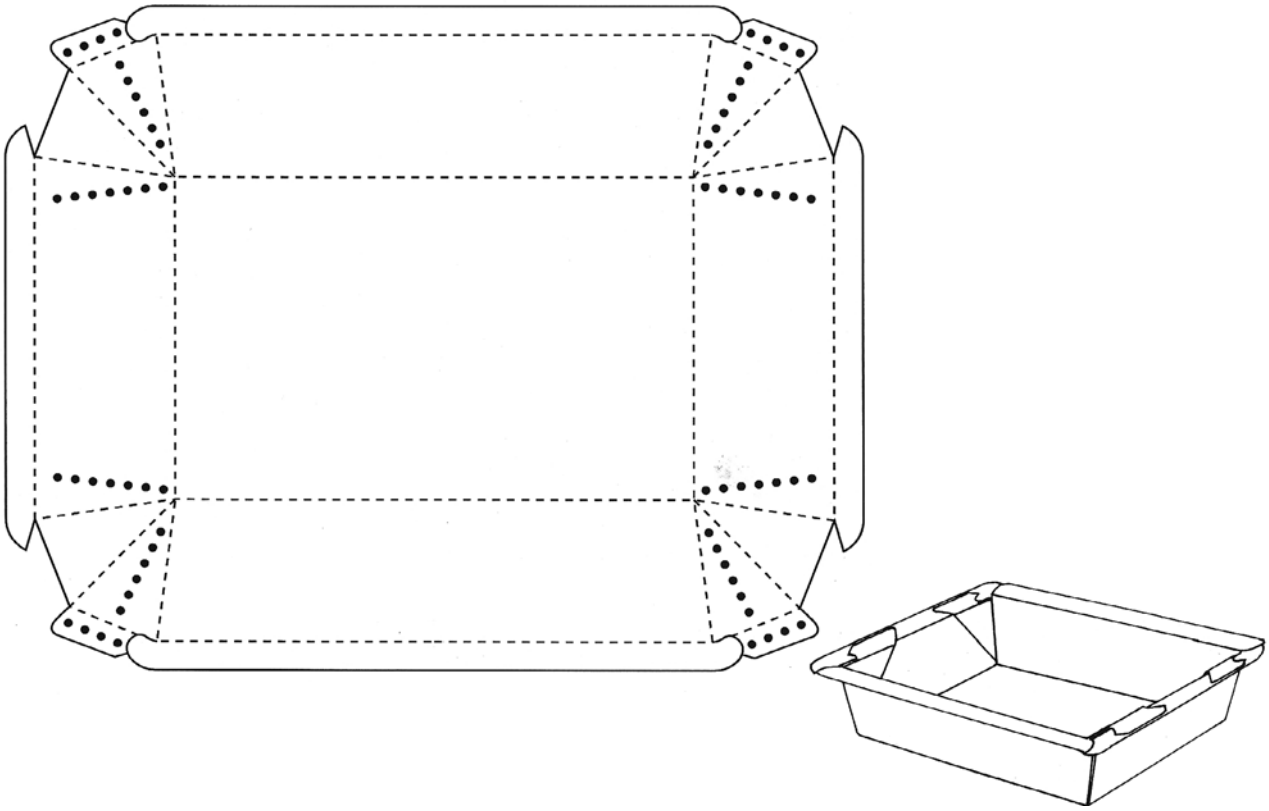
T-lock tray with beveled side and end panels



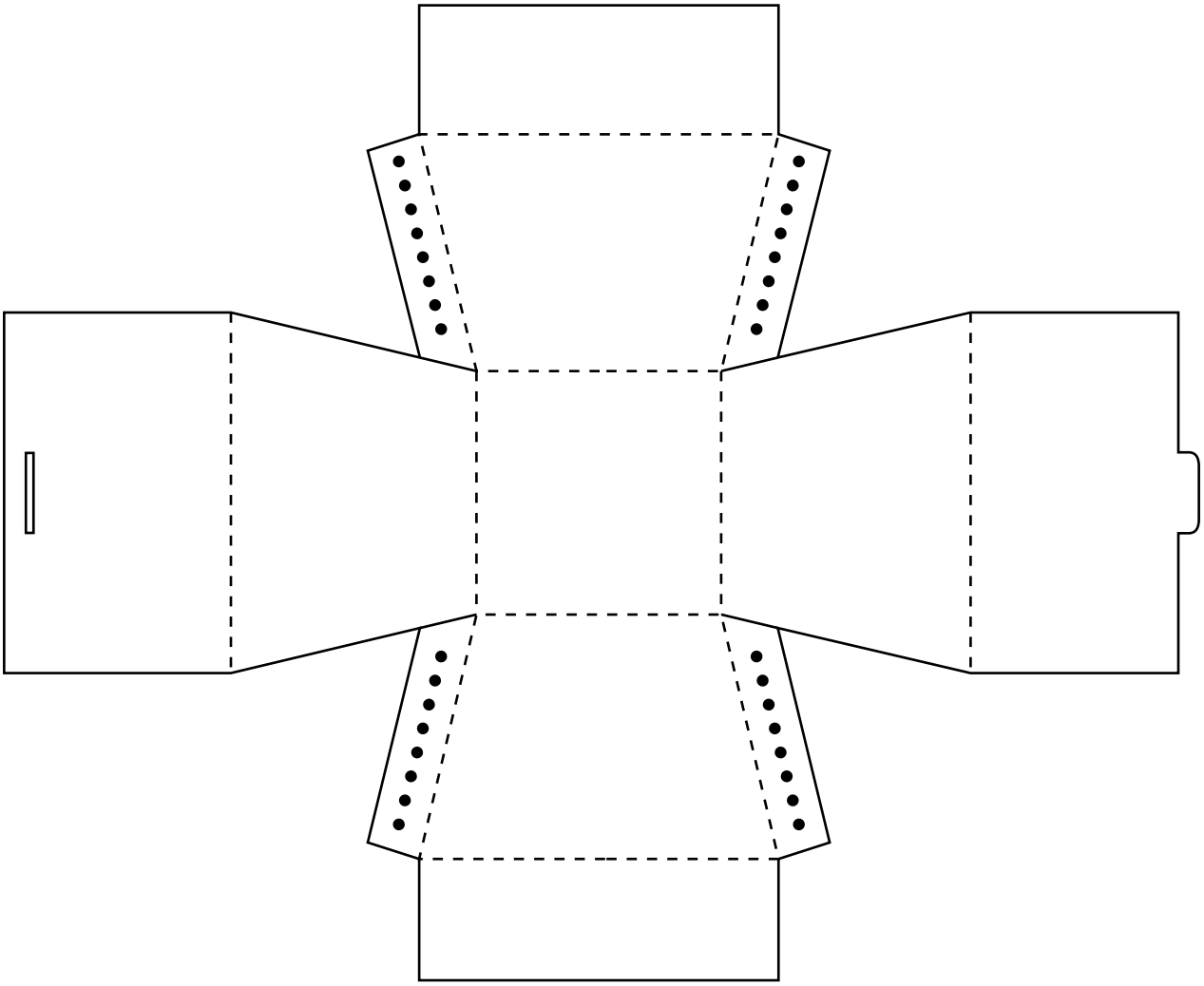
GLUED-CORNER TAPERED TRAY

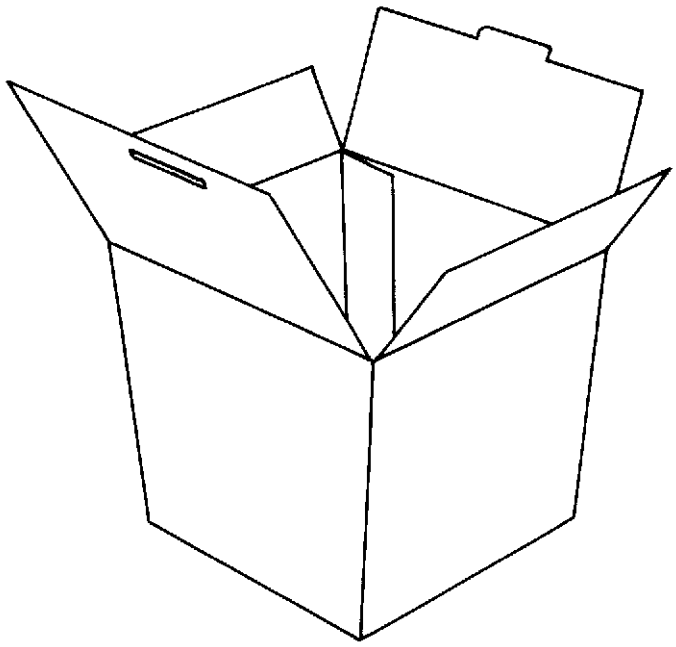


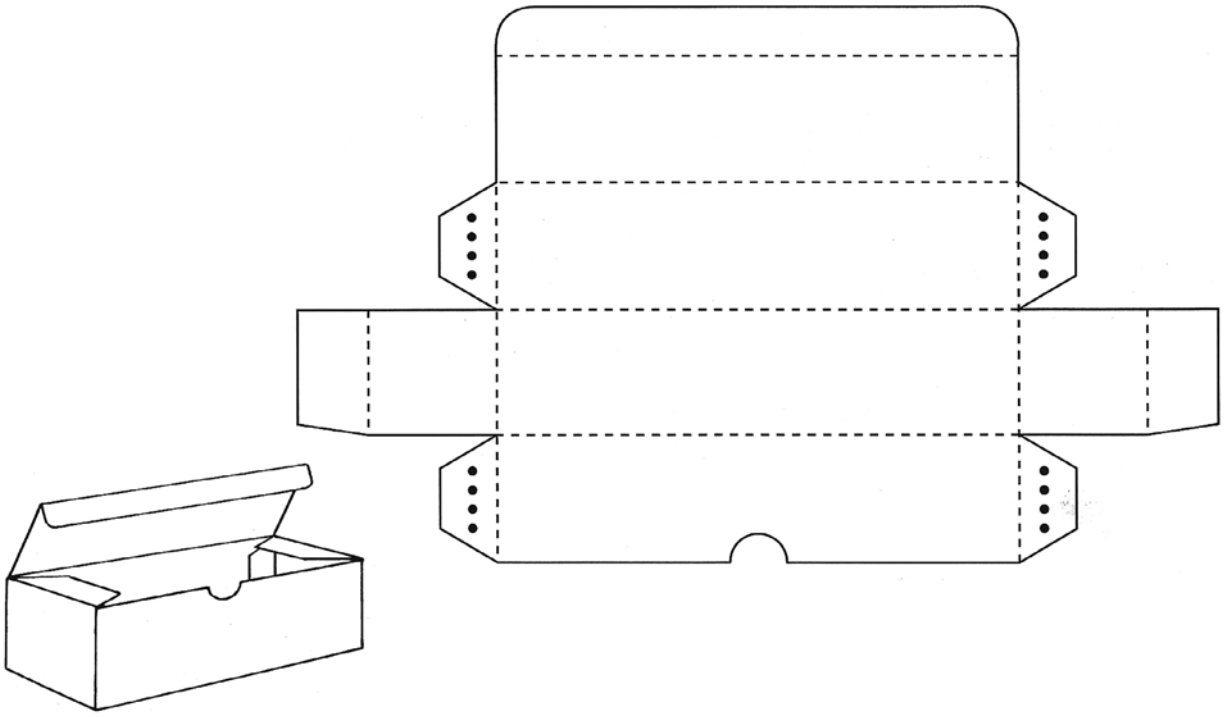
Glue- or heat-sealed tapered tray with flange

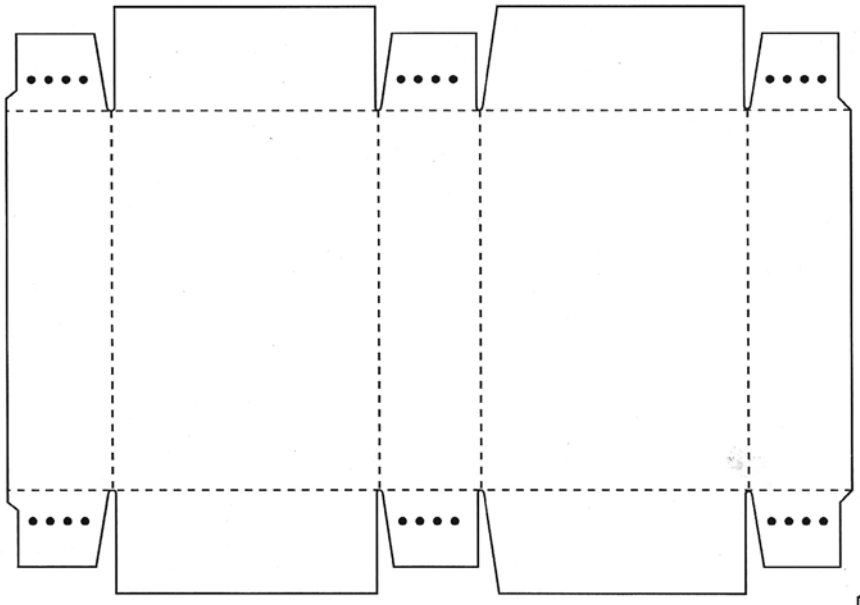


GLUED-CORNER TAPERED WITH TOP-LOCK TAB

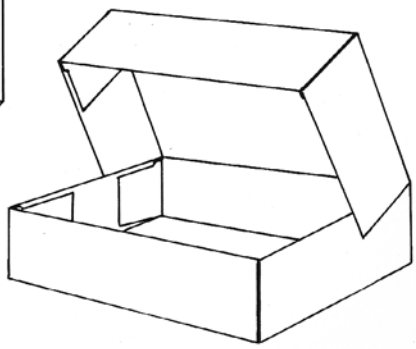




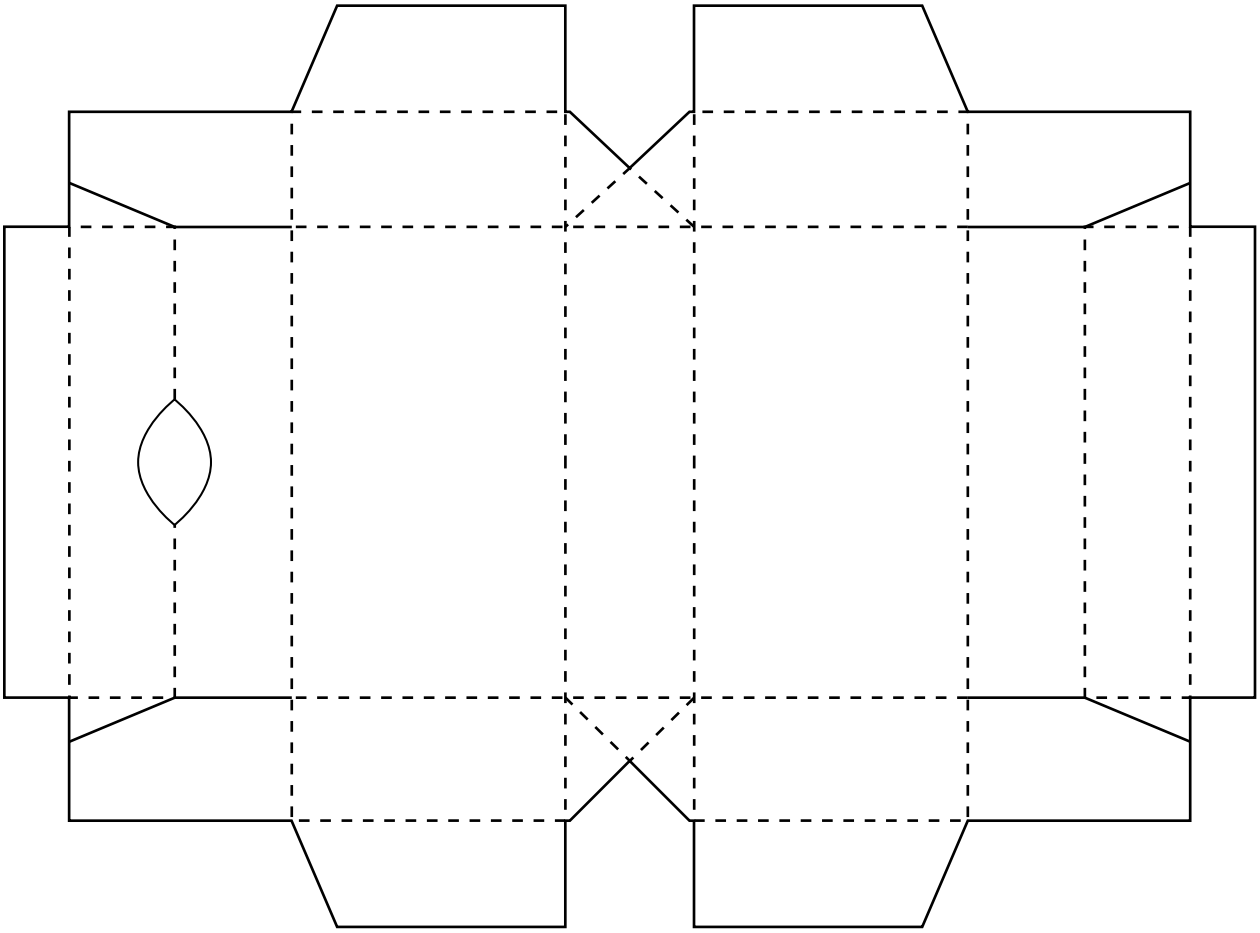


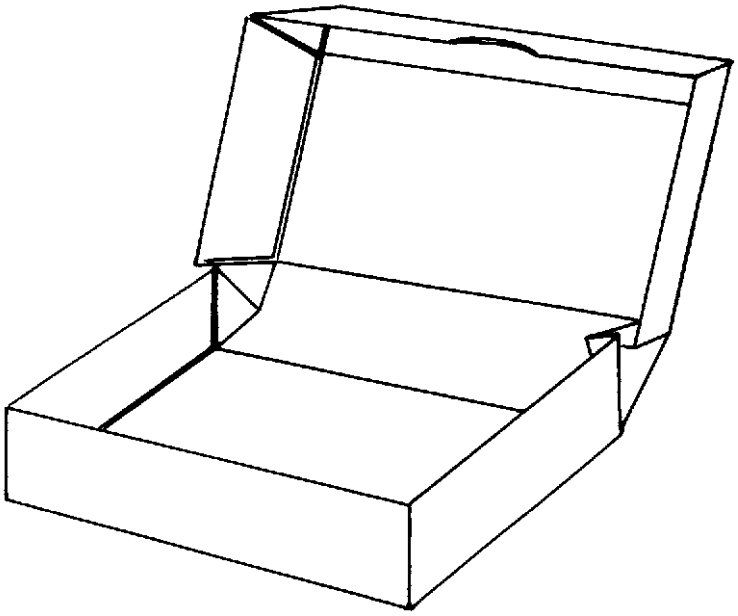


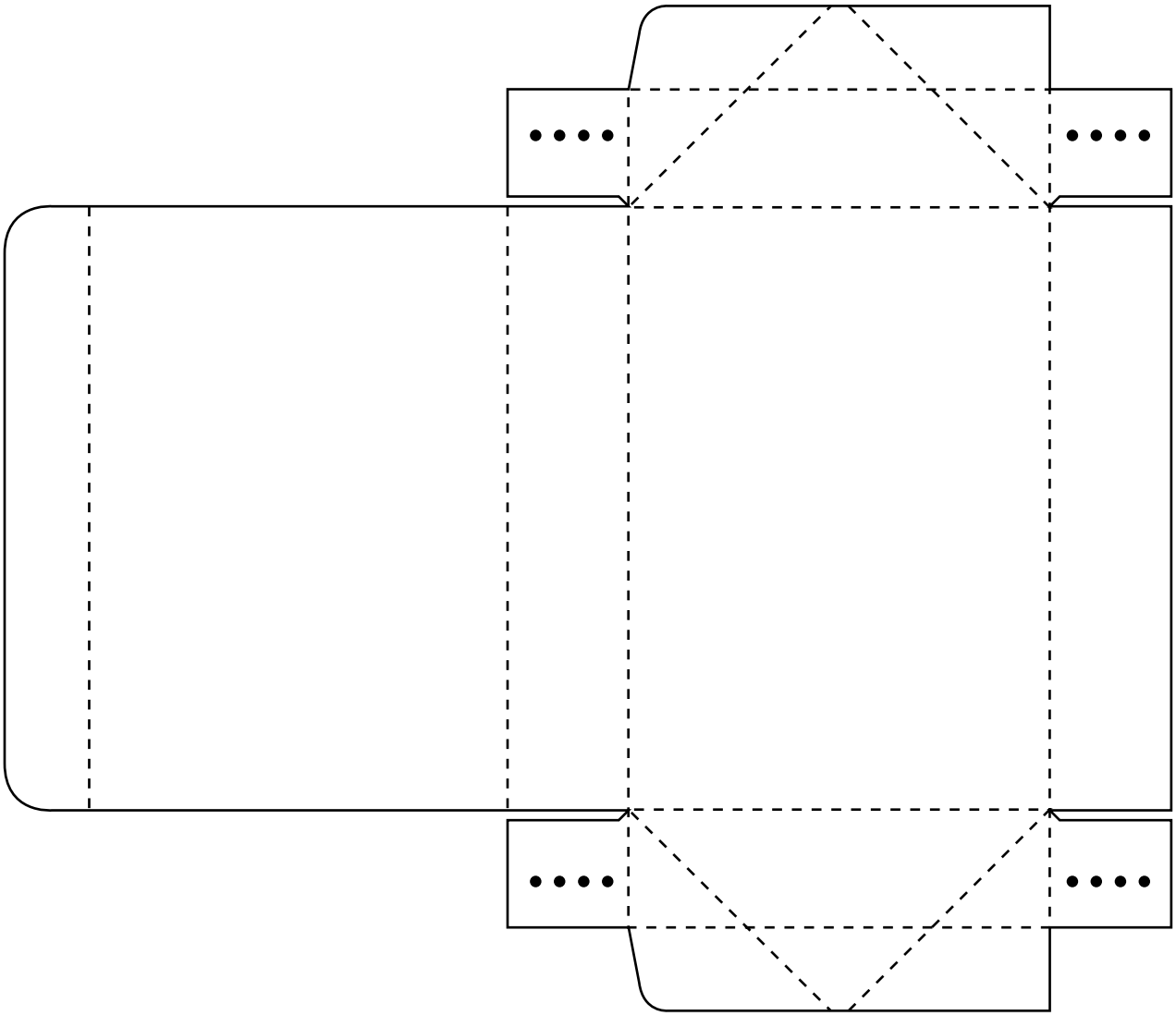
Six-corner brightwood-style tray

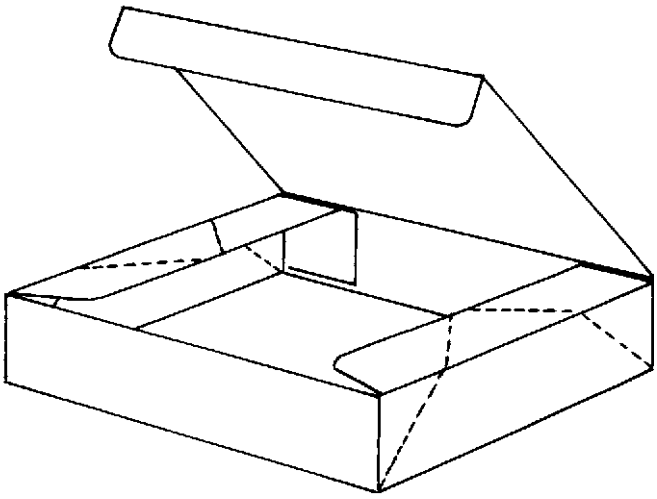


DOUBLE-WALL TRAY WITH DOUBLE-WALL LID

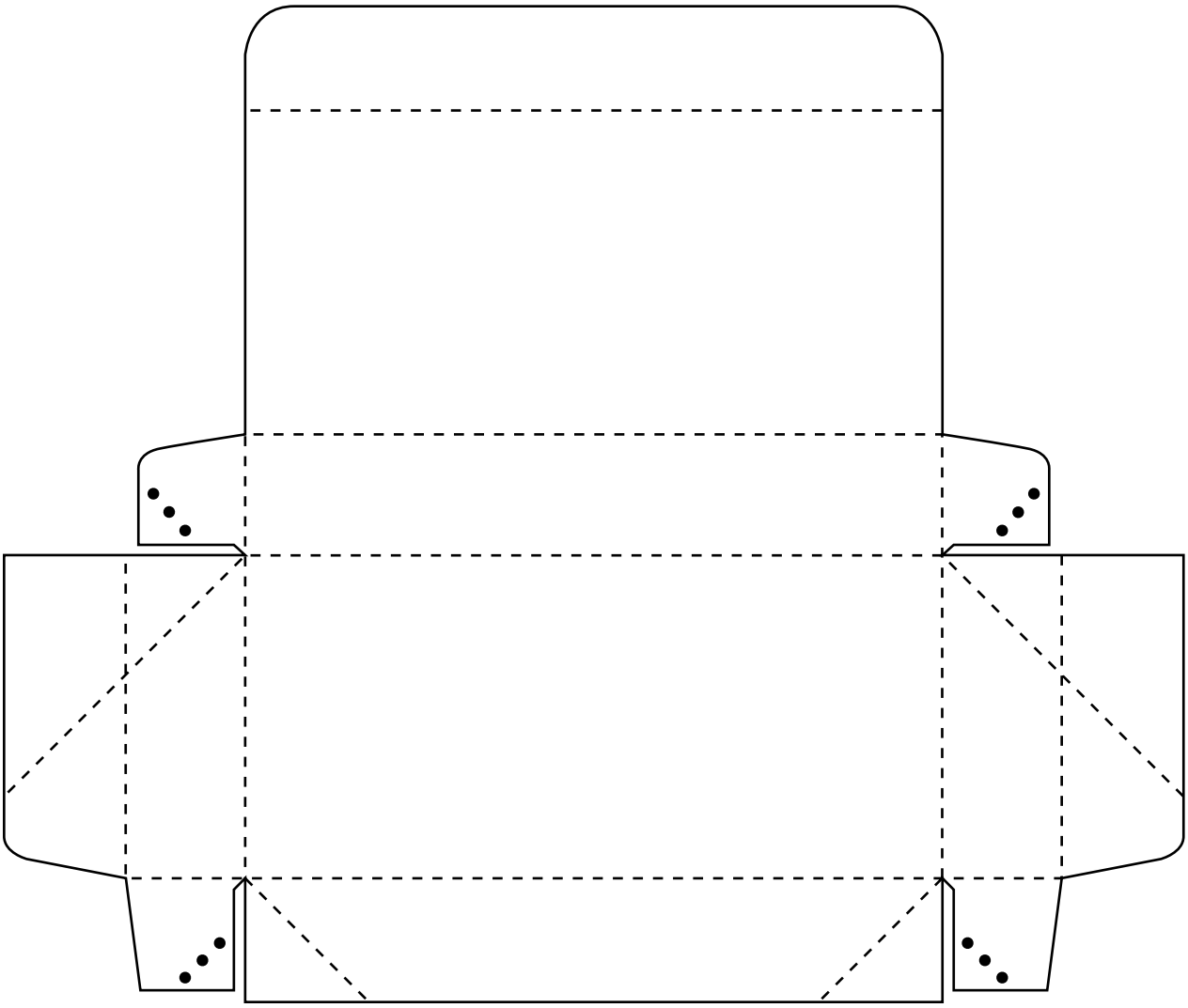


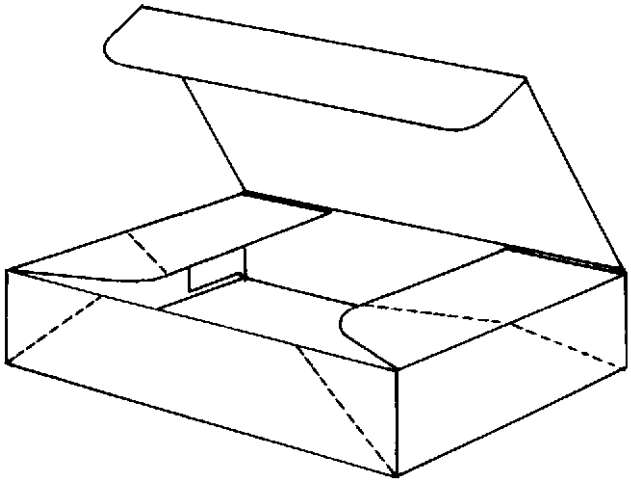




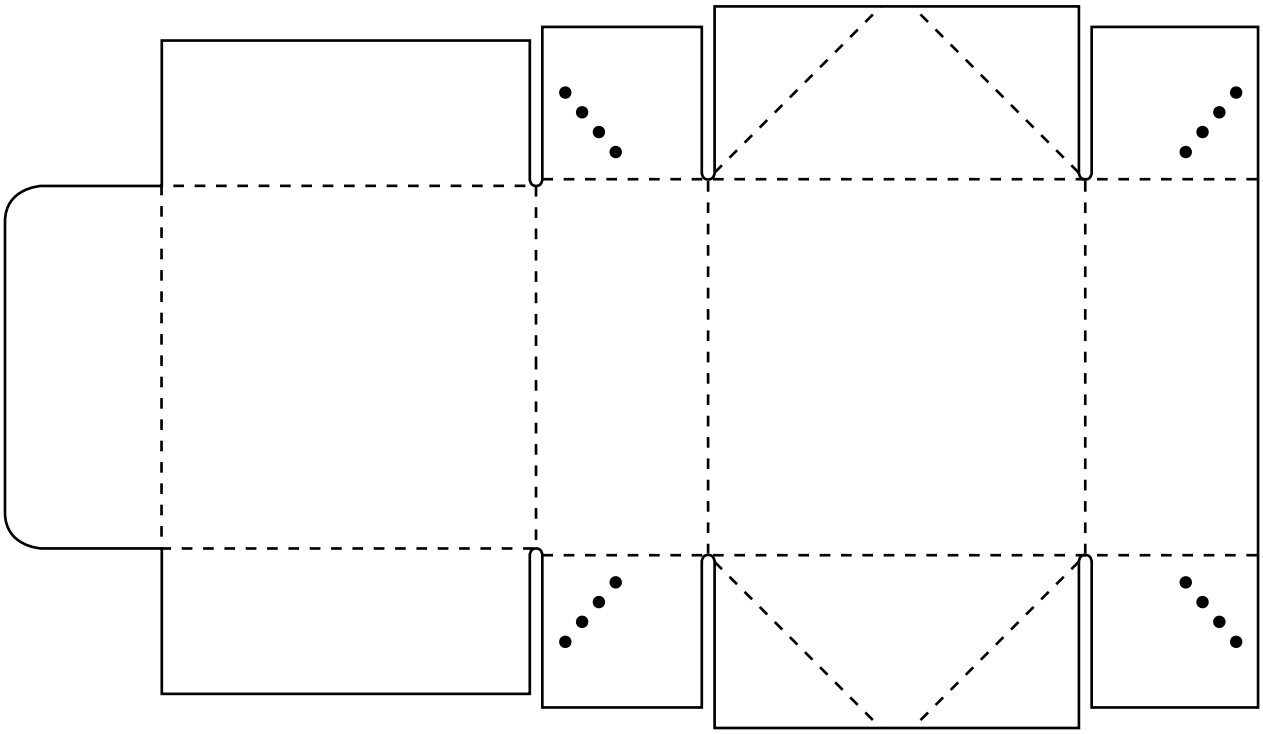


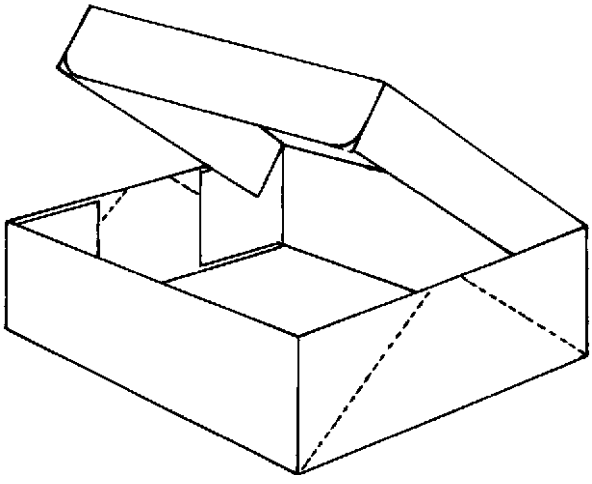
ONE-PIECE BEERS INFOLD WITH DUSTFLAPS



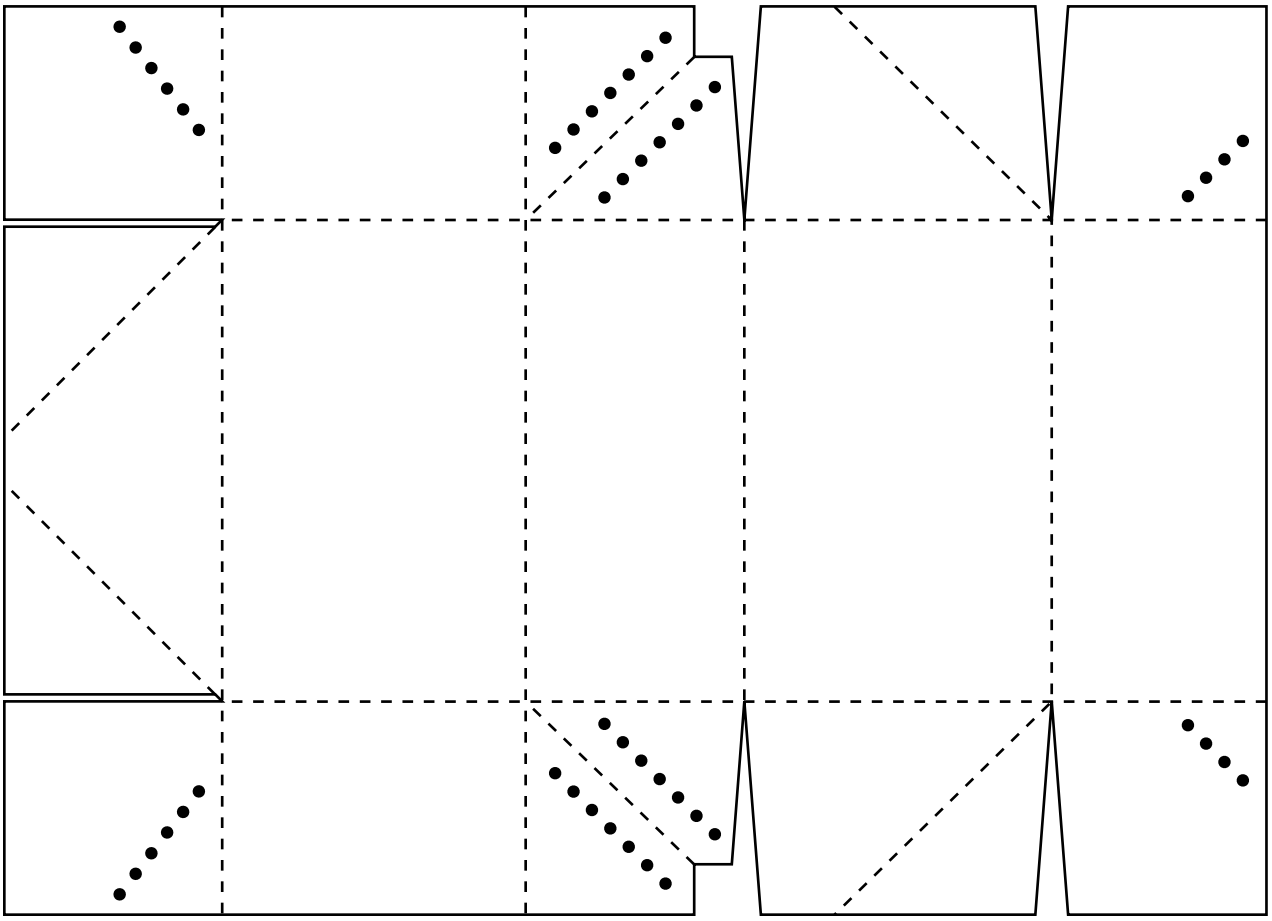


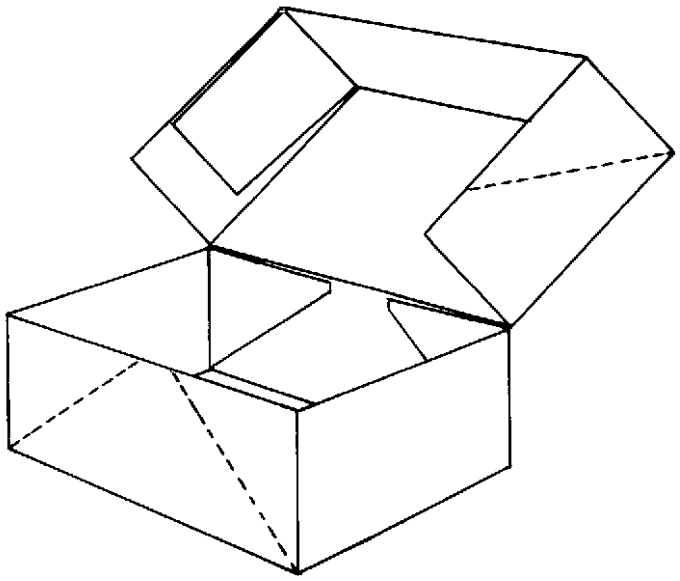
ONE-PIECE BEERS INFOLD WITH DUSTFLAPS OFF COVER

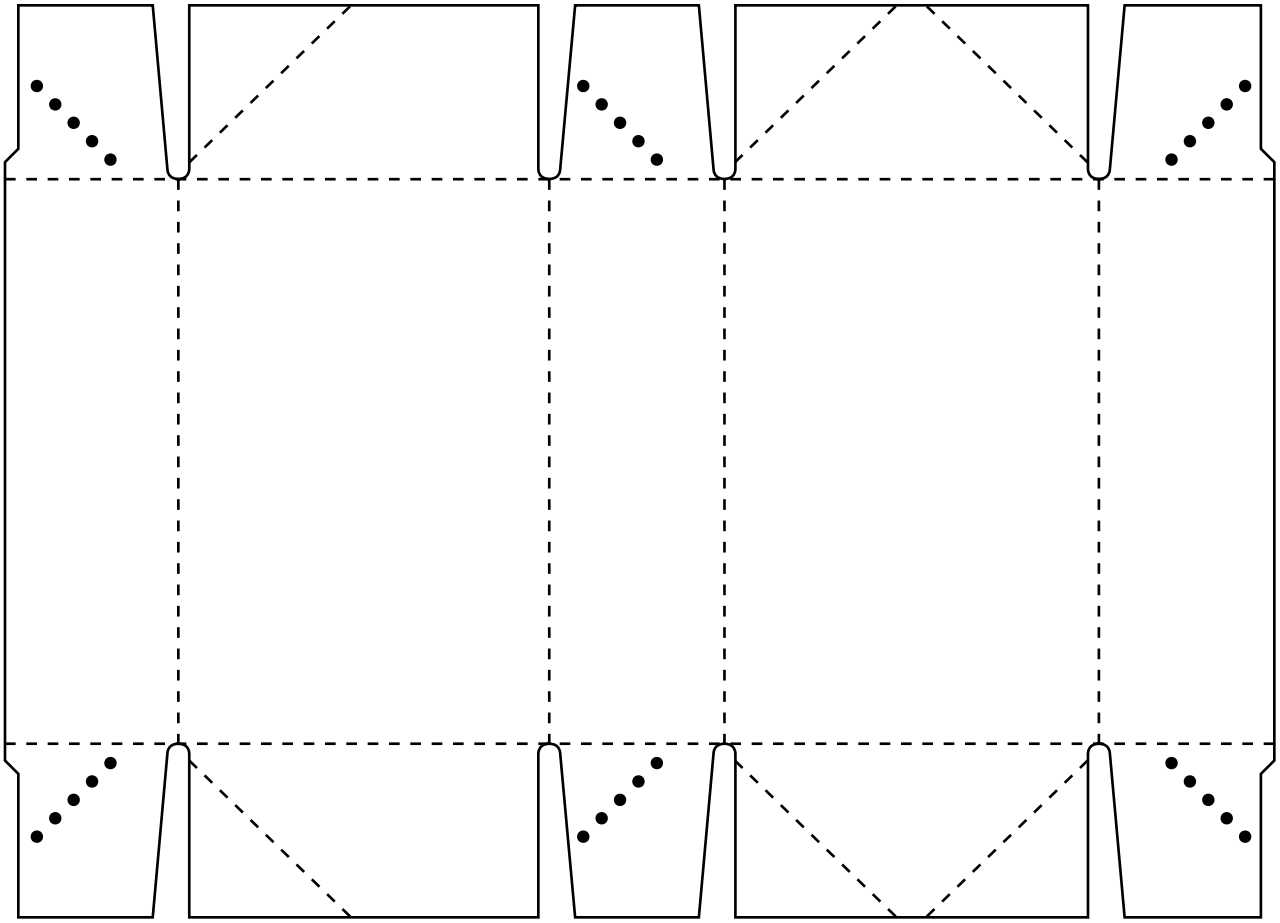


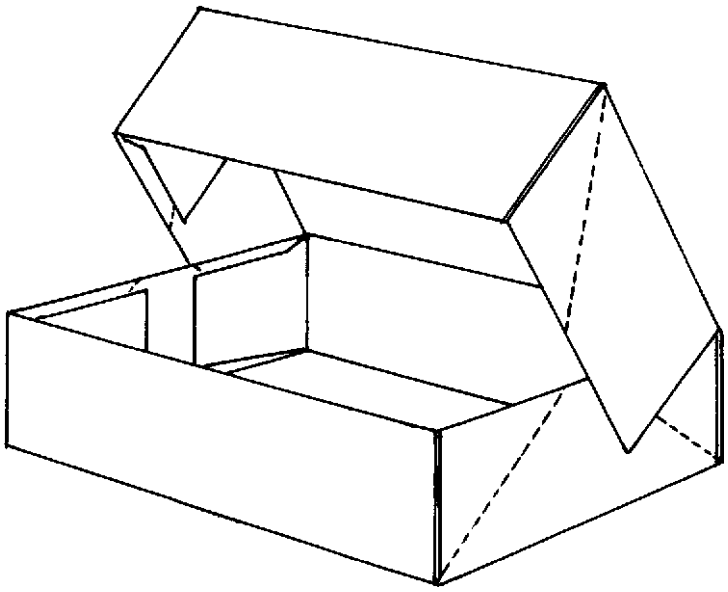


ONE-PIECE BEERS FOUR-CORNER INFOLD WITH COVER

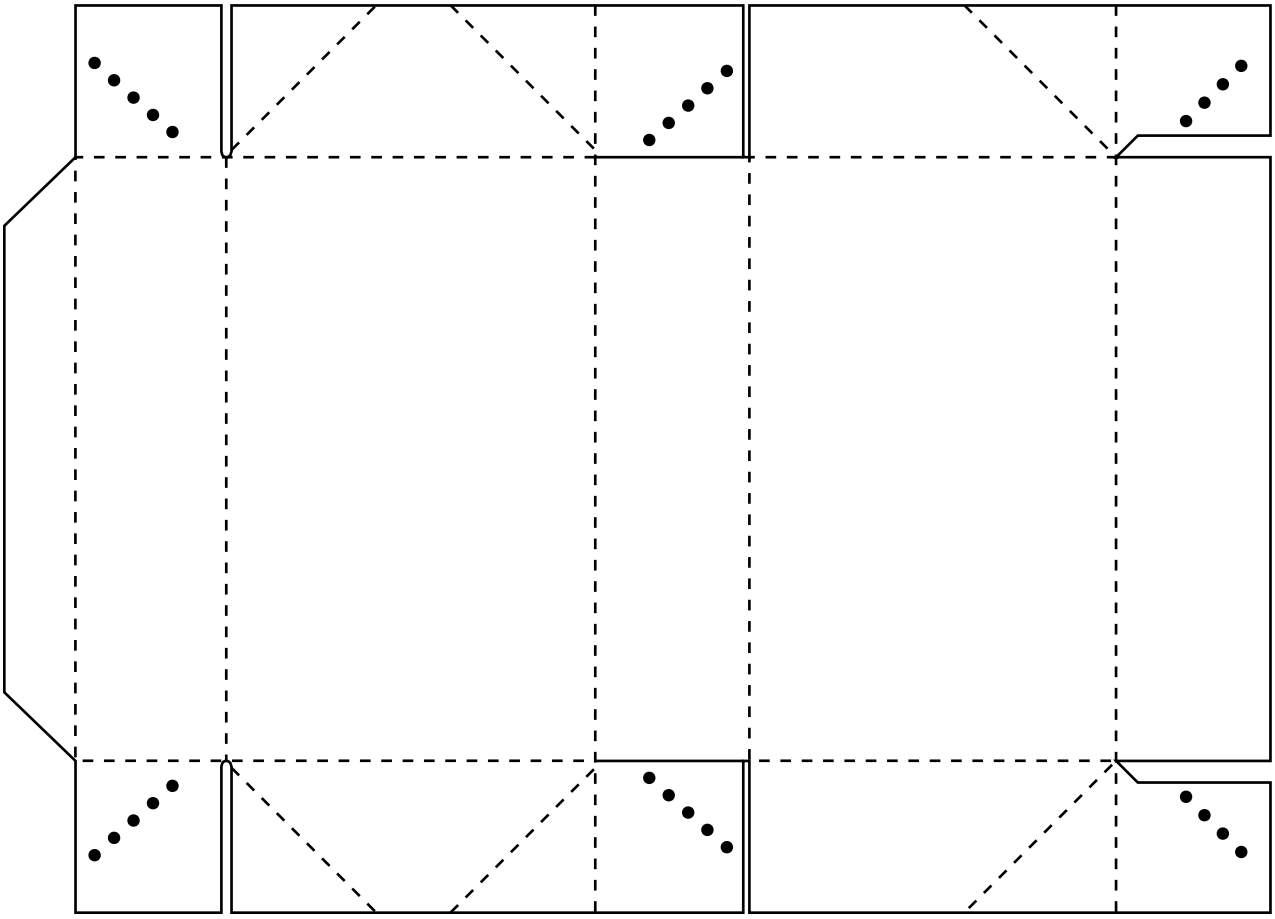


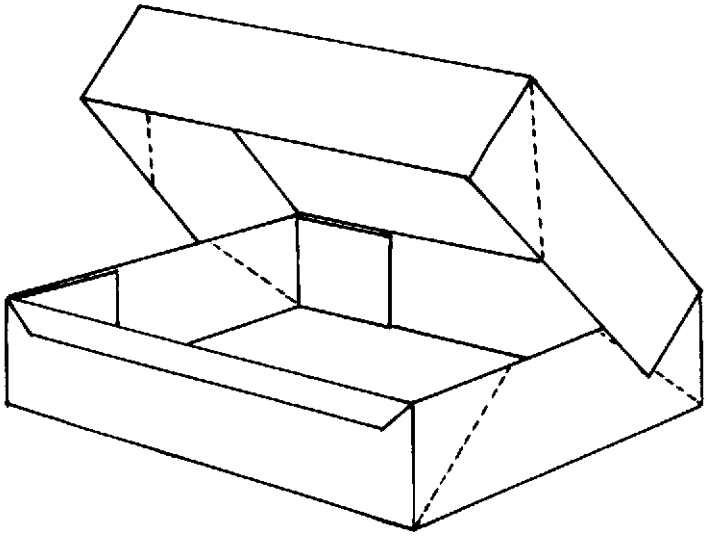


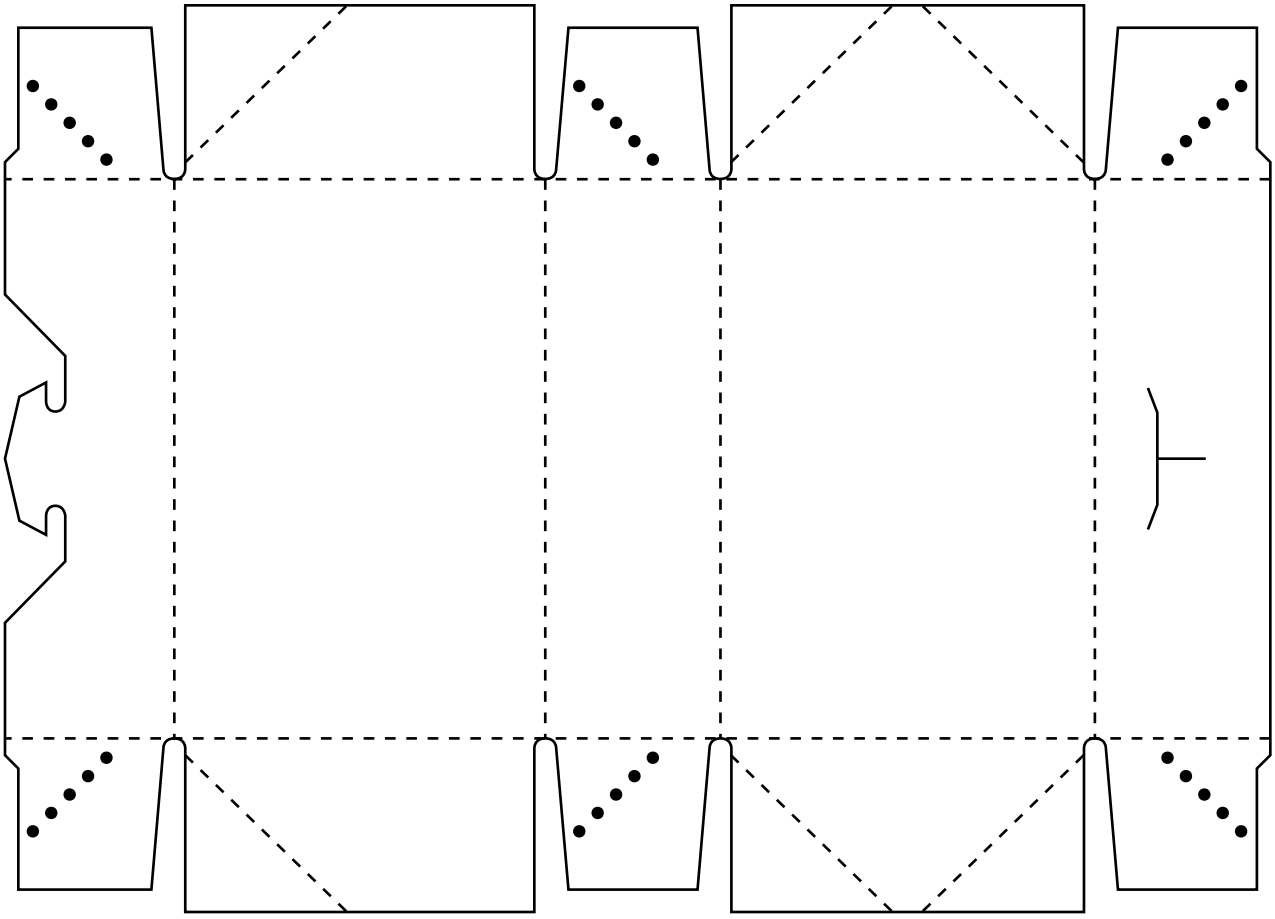


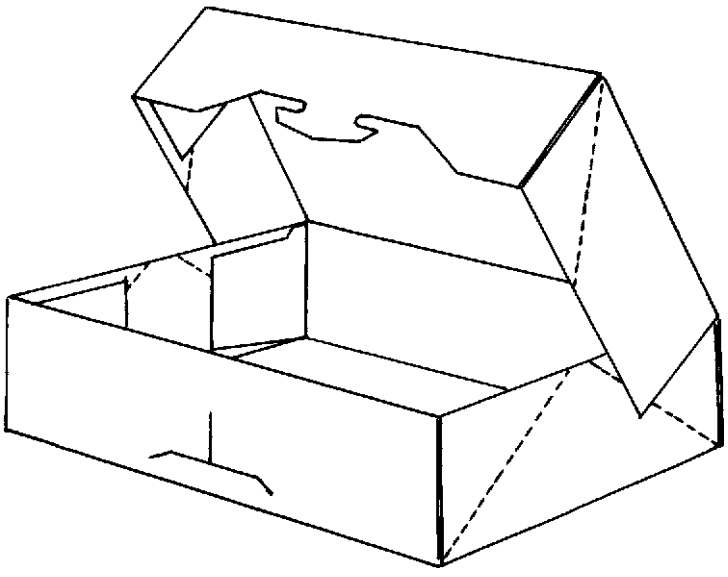


SIX-CORNER GLUE-STYLE TRAY WITH FLIP-TOP COVER

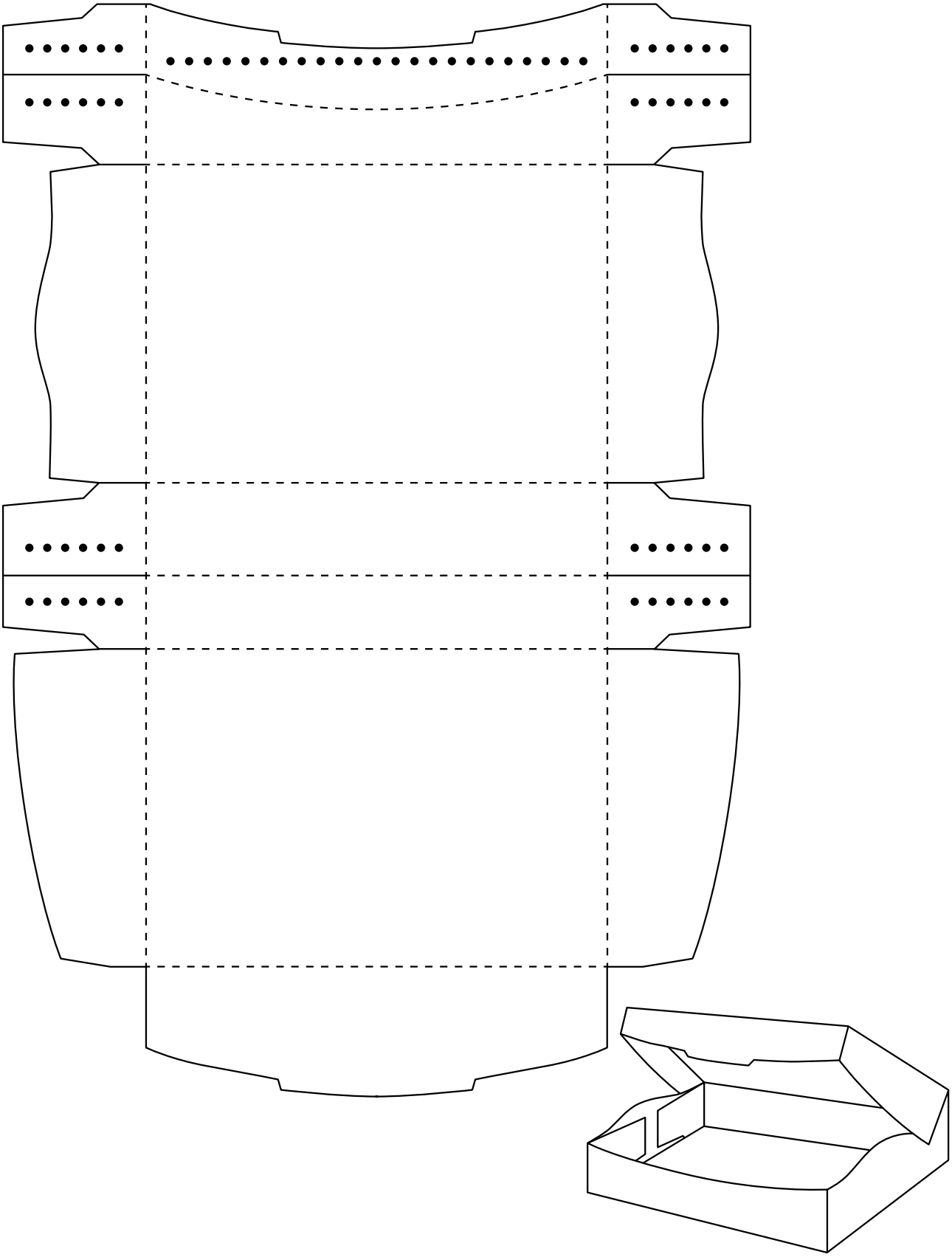


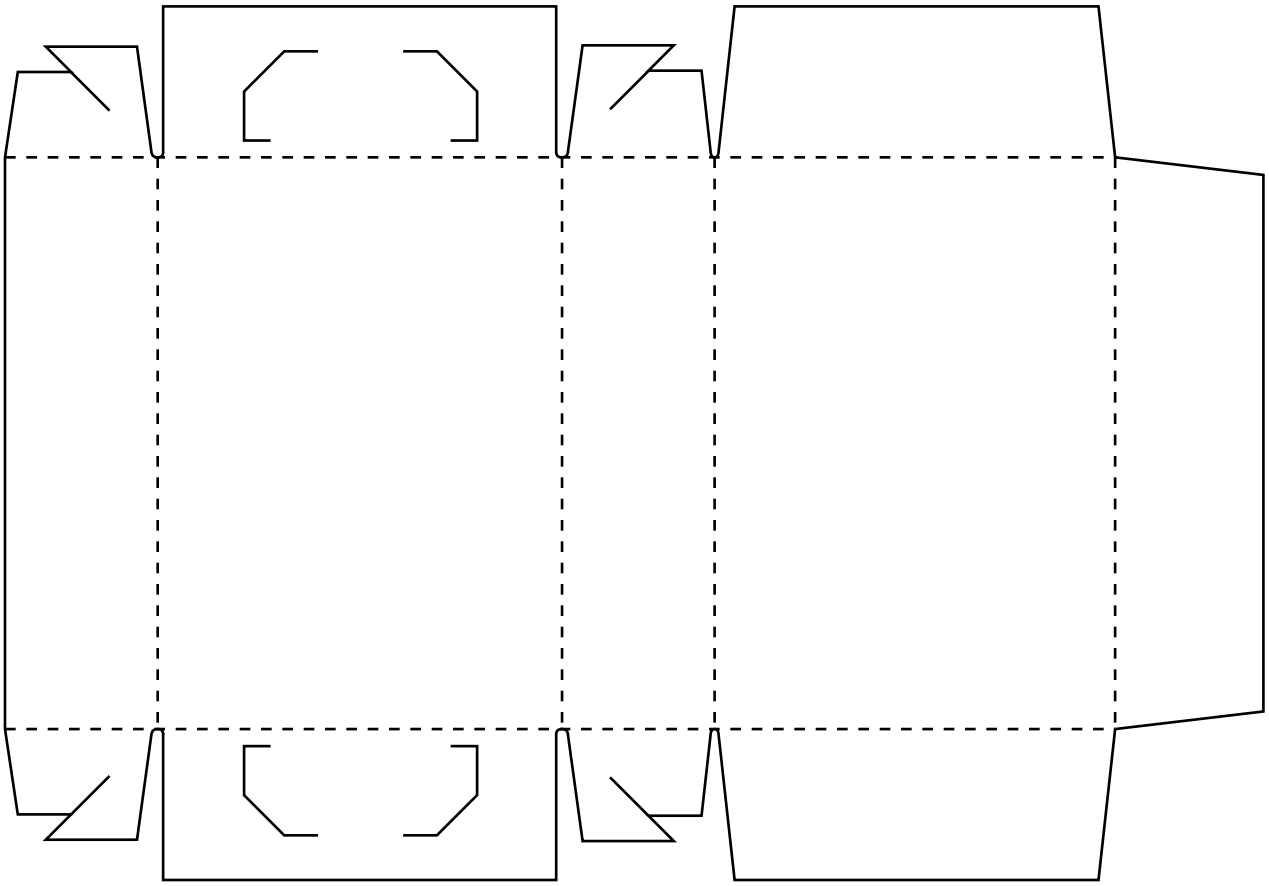


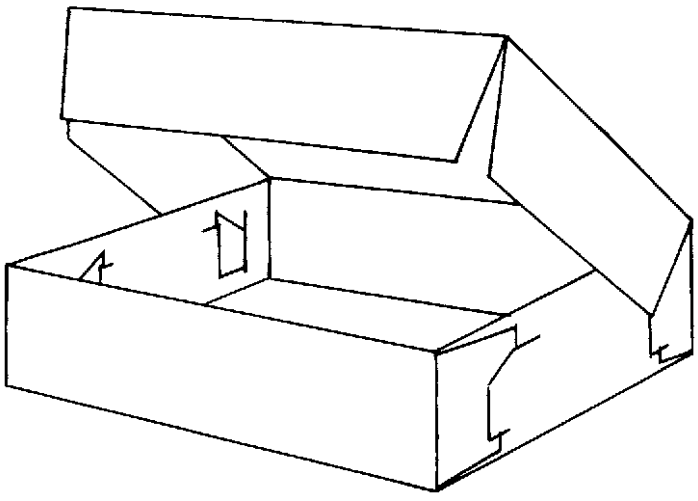


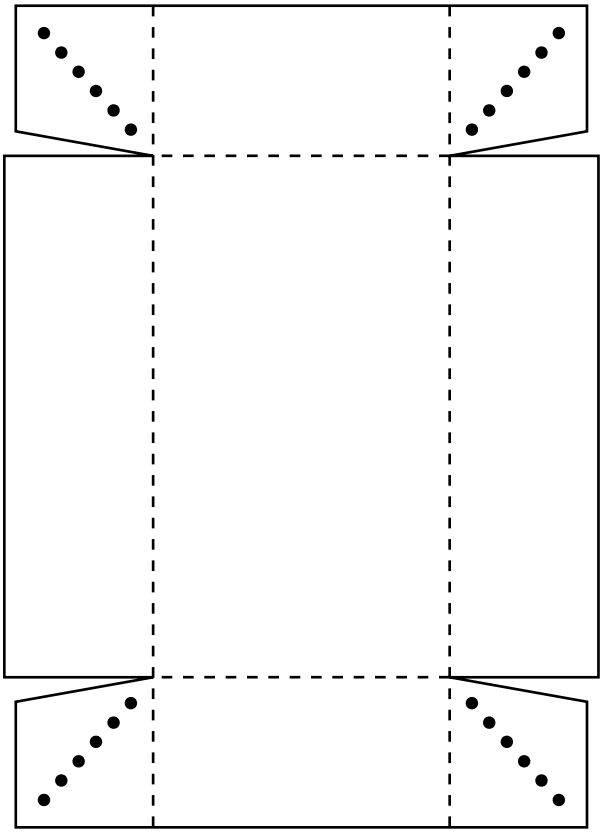


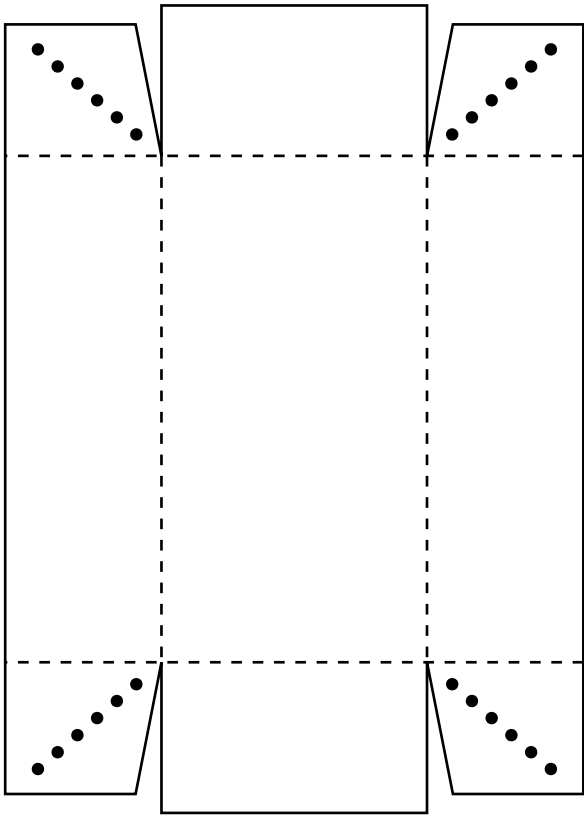
TRAY WITH SCALLOPED SIDE PANELS

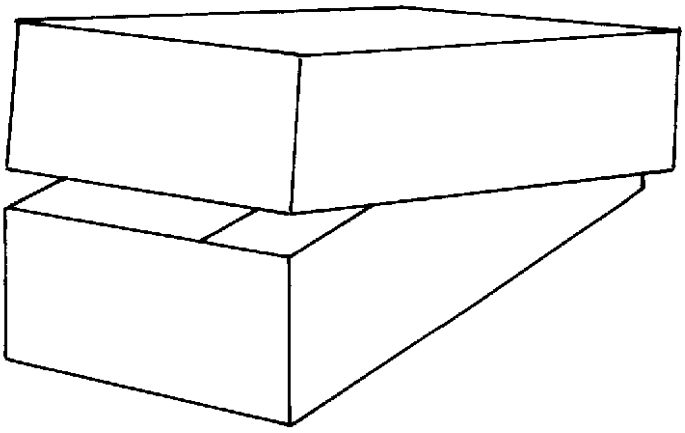


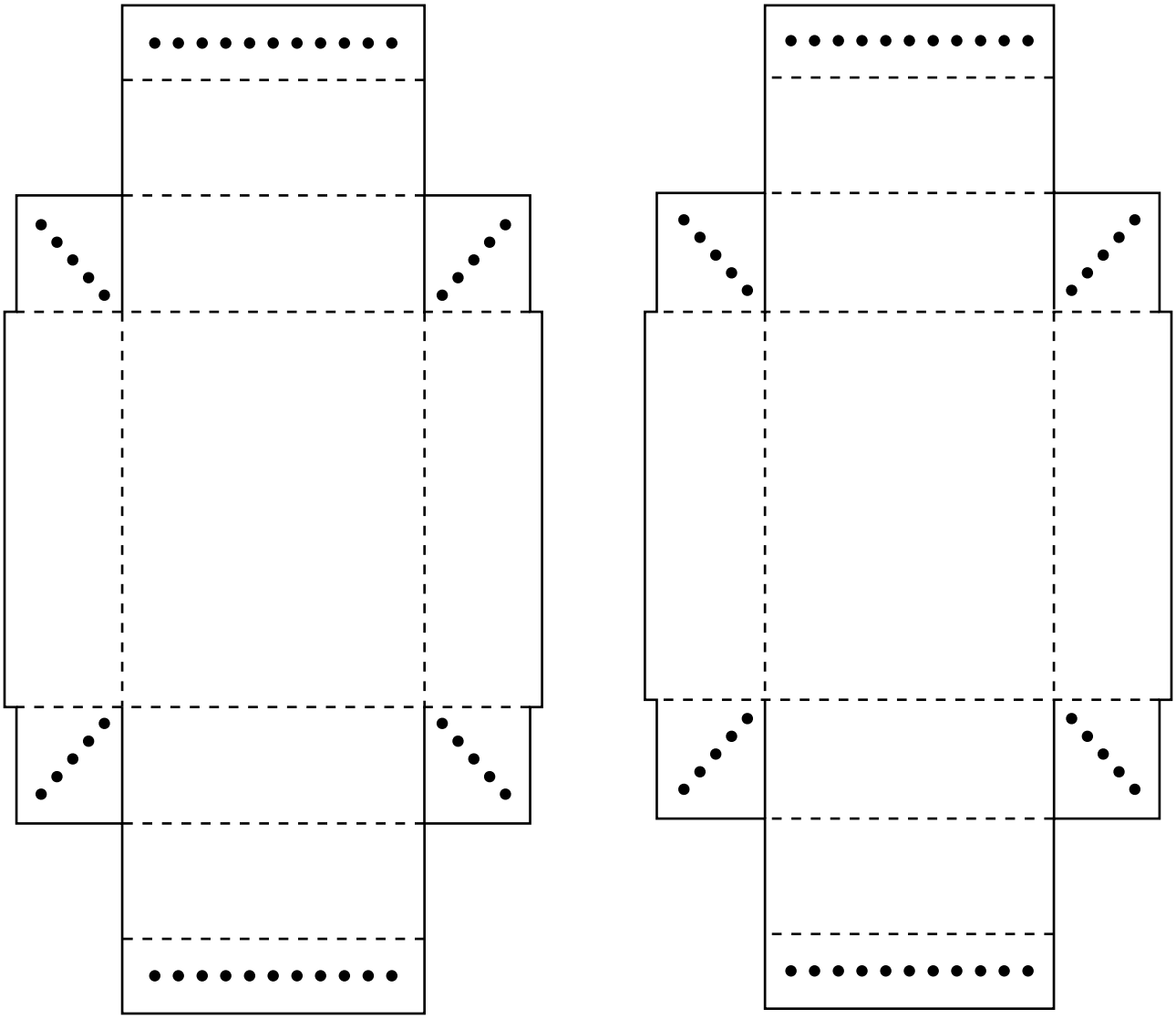


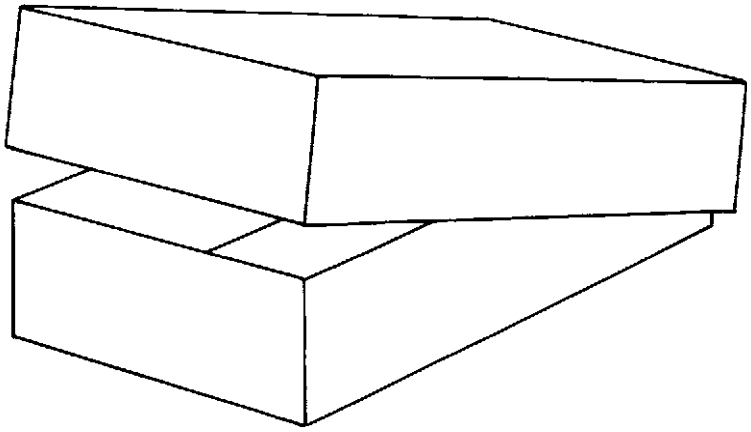




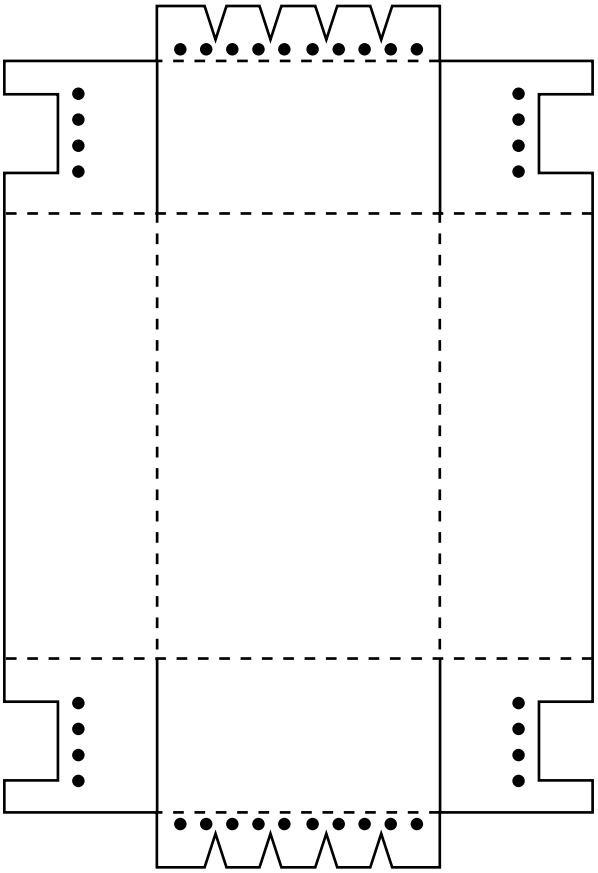


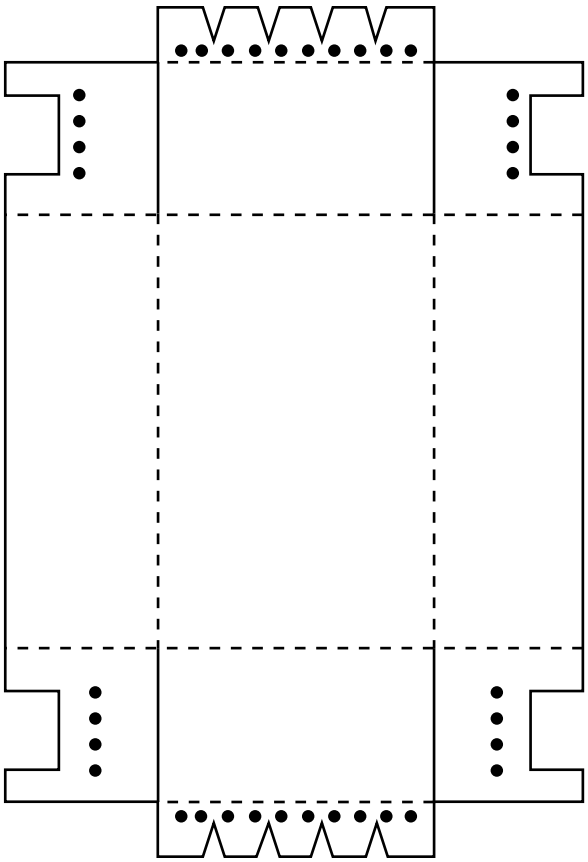


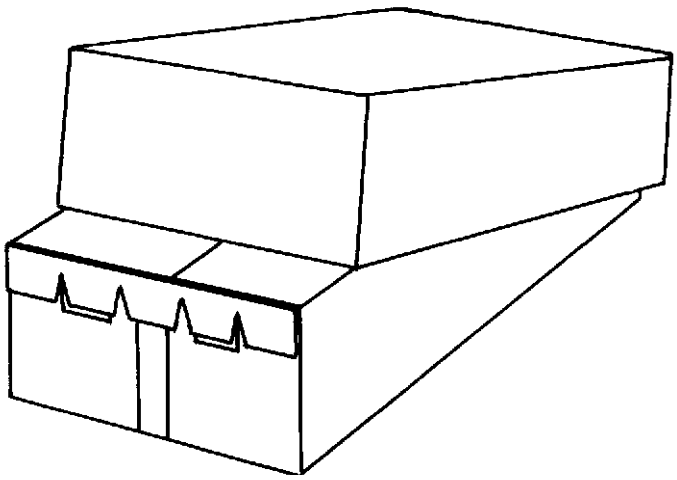


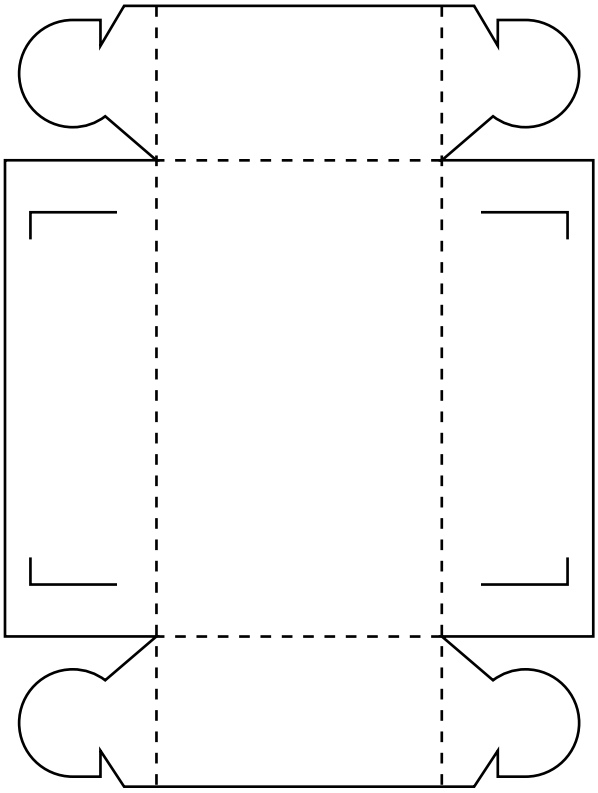


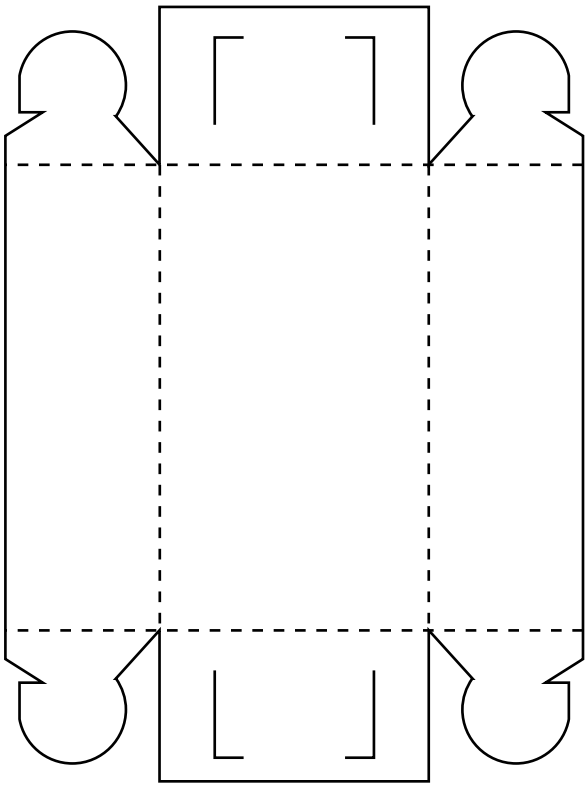
TWO-PIECE FULL TELESCOPING HARDWARE-STYLE TRAY WITH LOCK ENDS

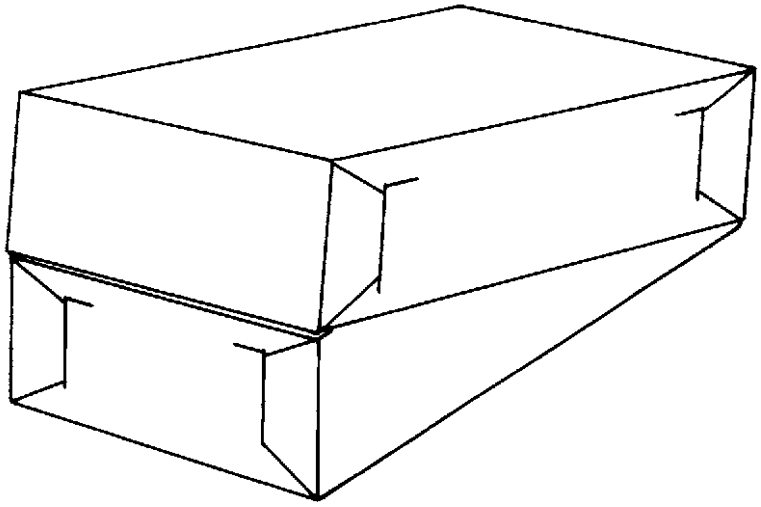




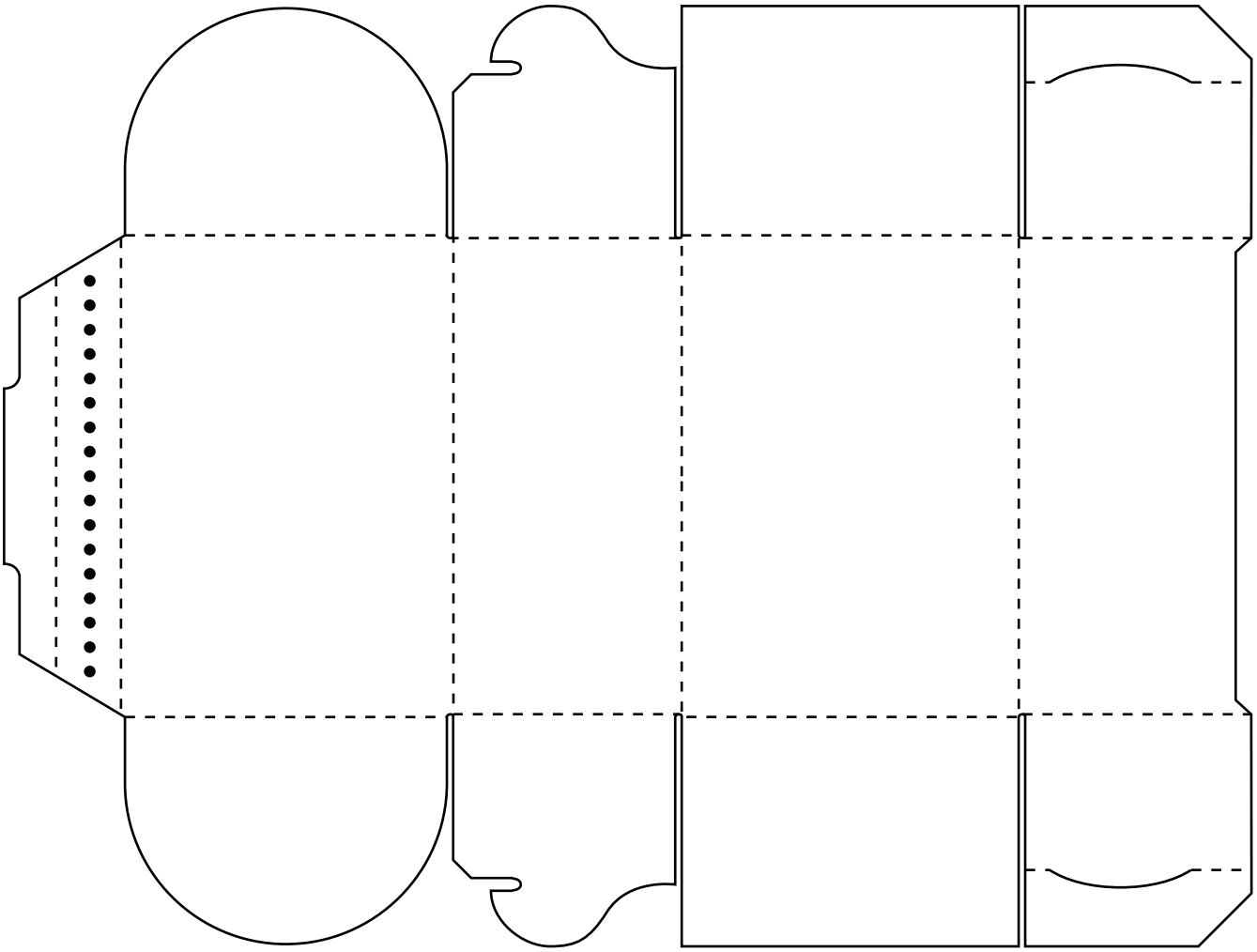


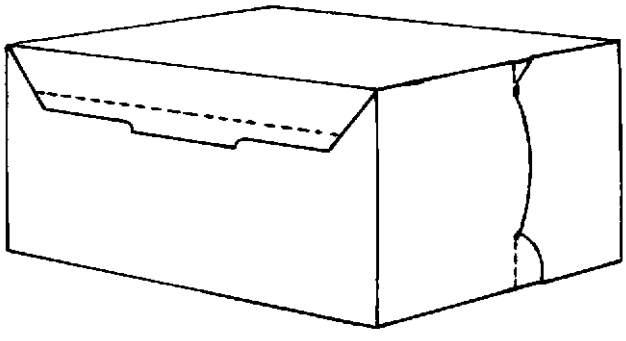


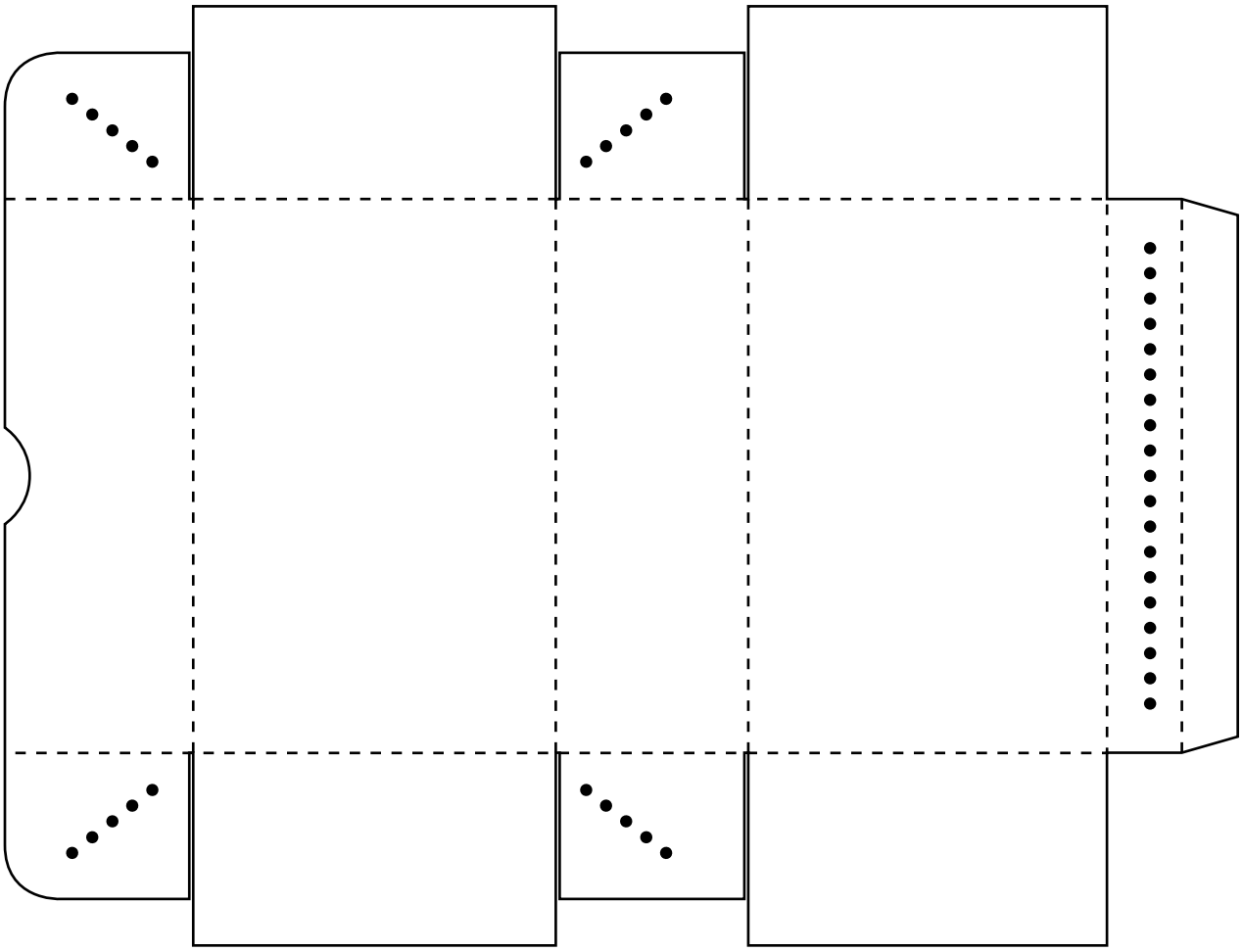


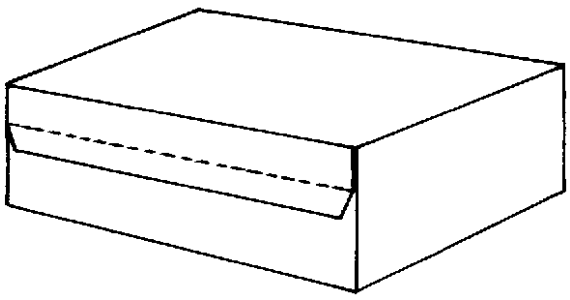


TRUE LOCK-STYLE TRAY WITH GLUED COVER TEAR-AWAY STRIP

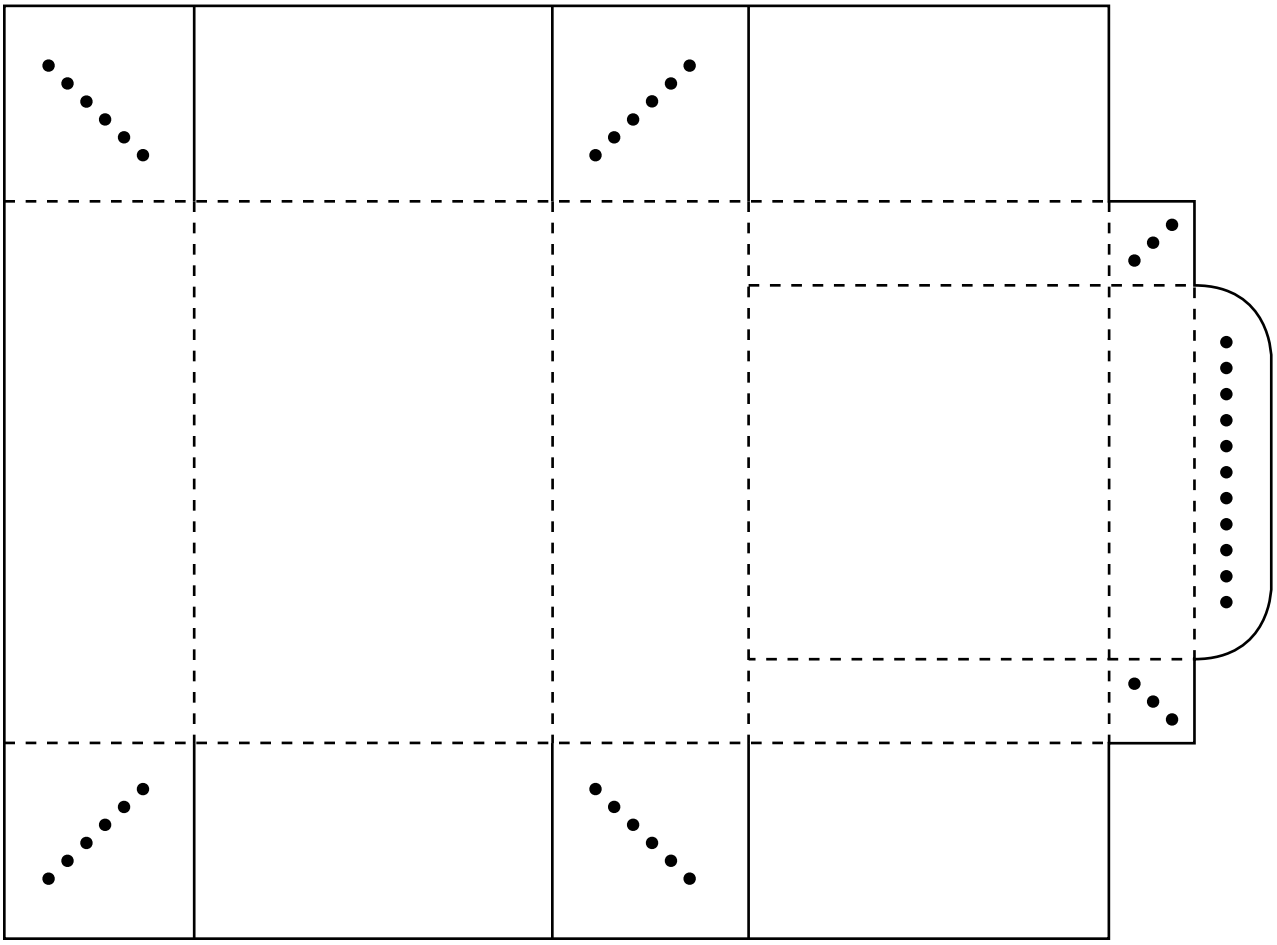


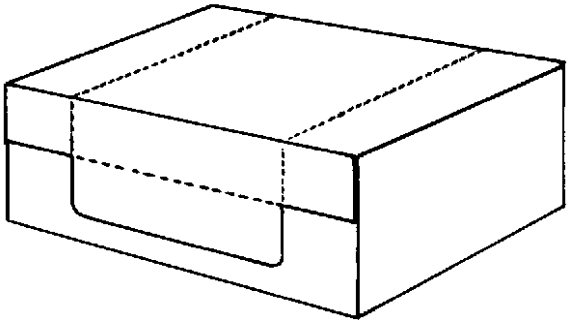


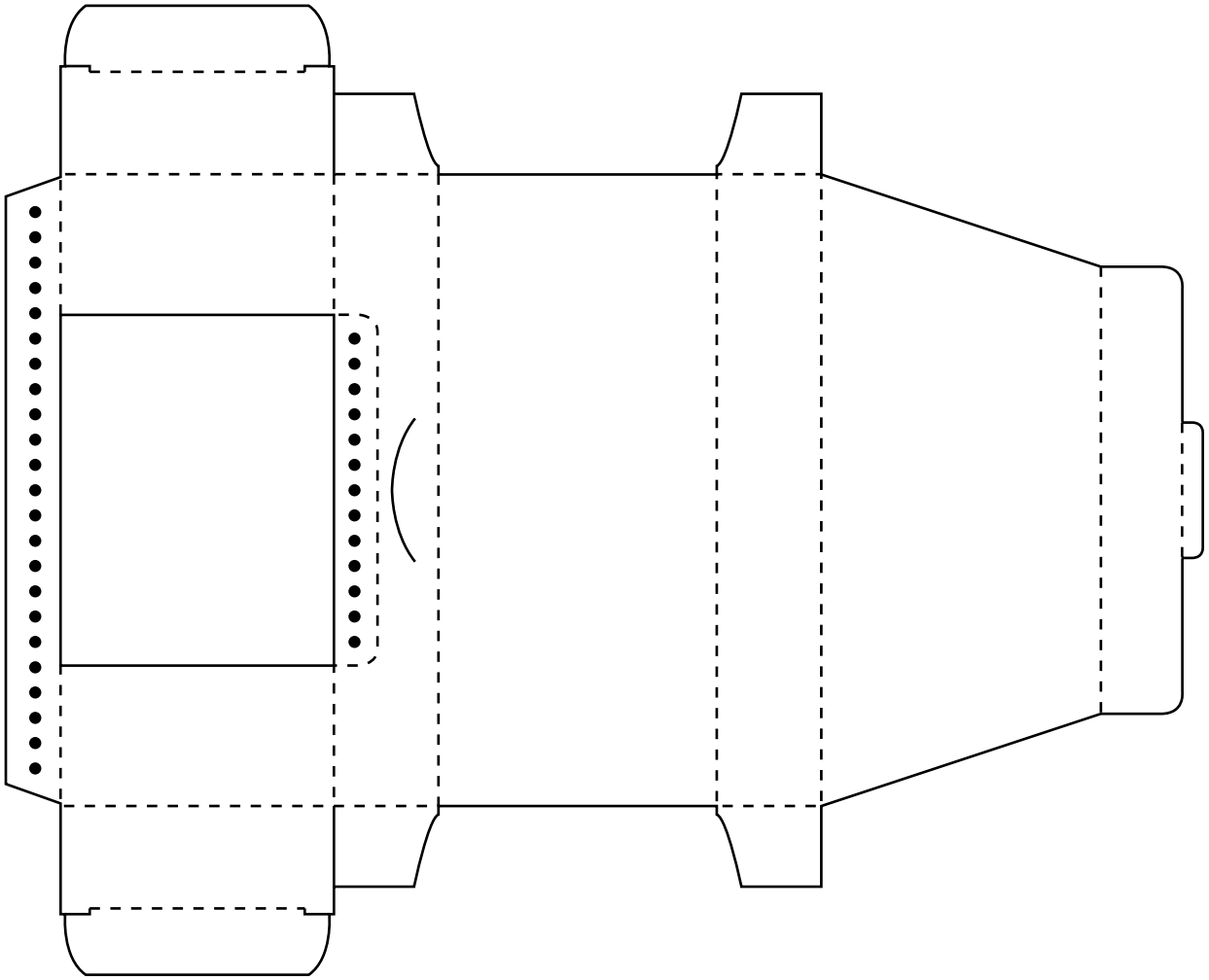




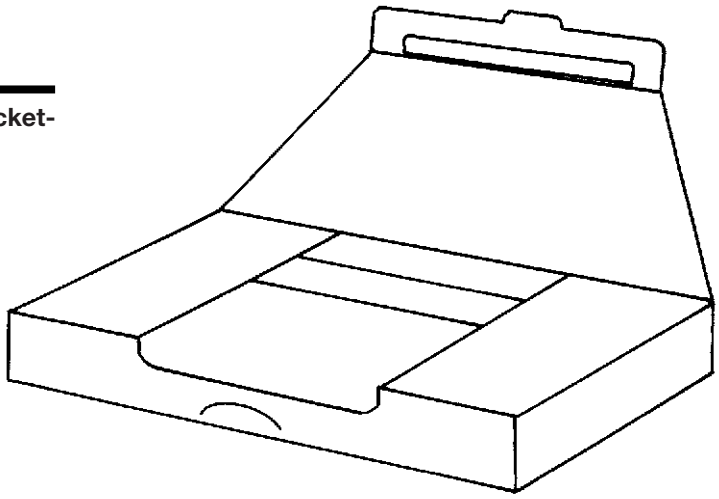
SEAL-END-STYLE TRAY WITH PERFORATED TEAR-AWAY TOP



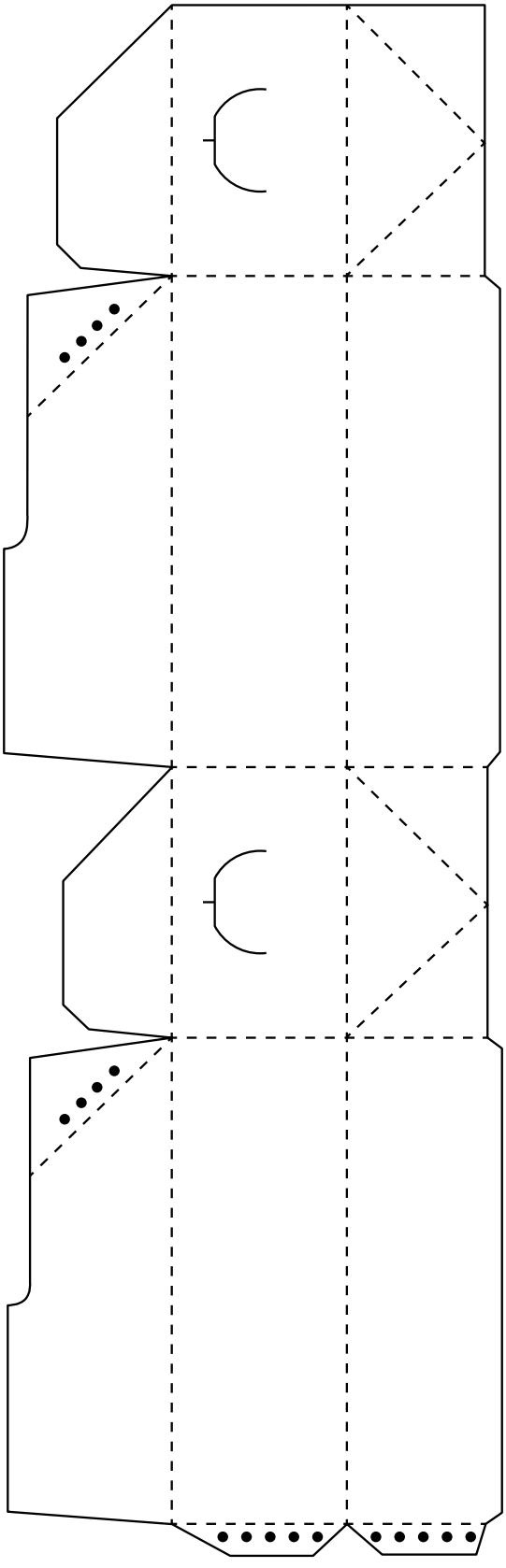


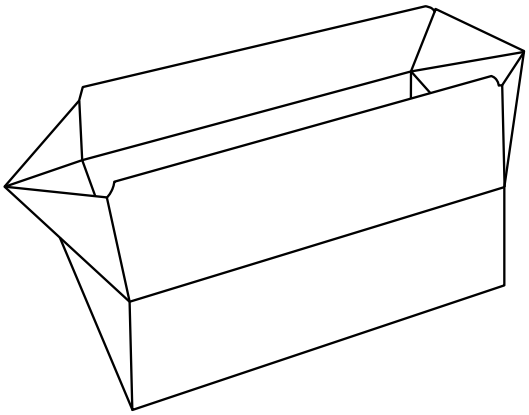


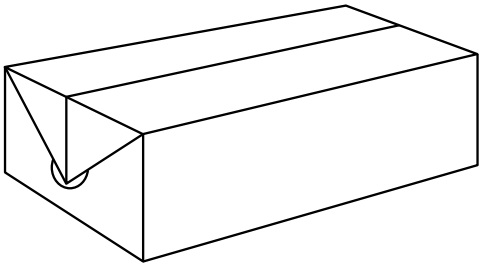
Ideal for a small tissue dispenser that fits in pocket-book or briefcase.

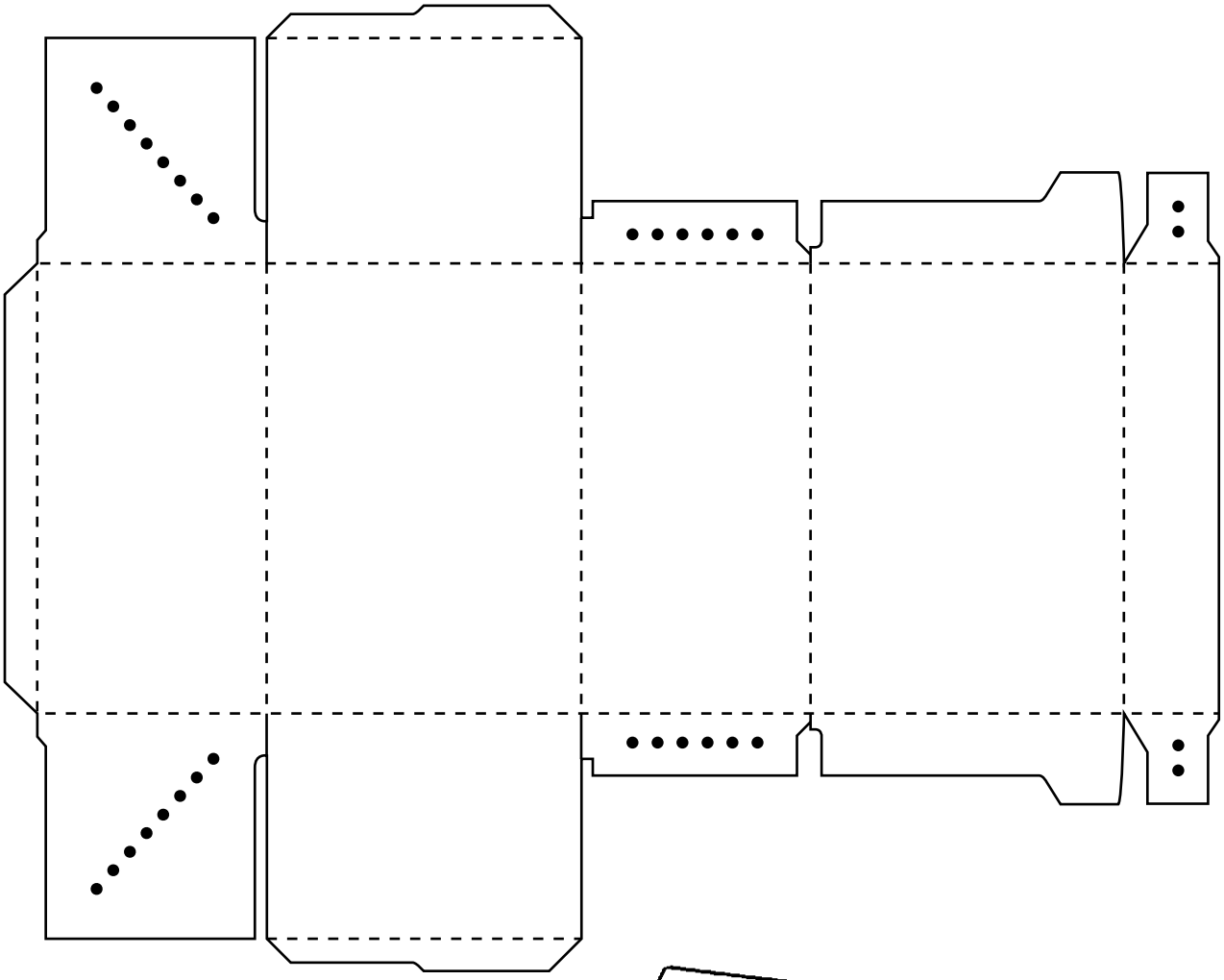


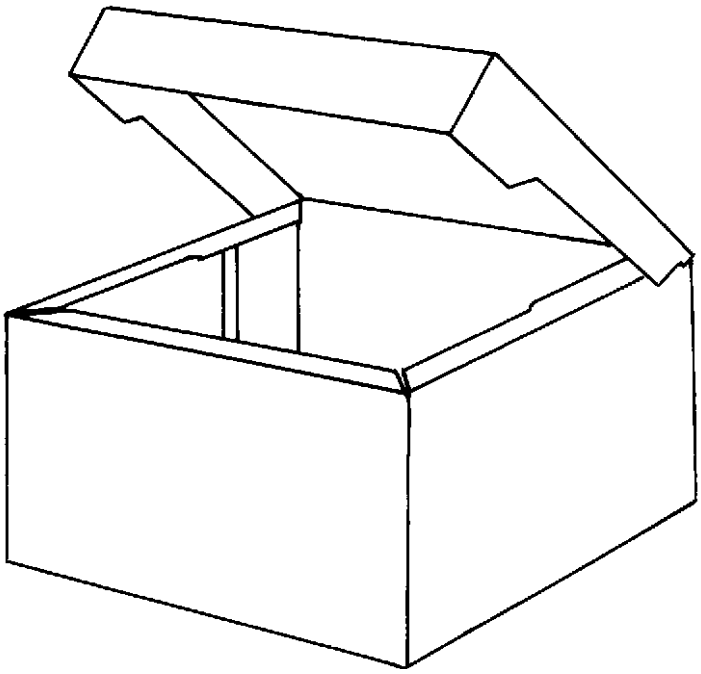
FOLD-OVER COVER



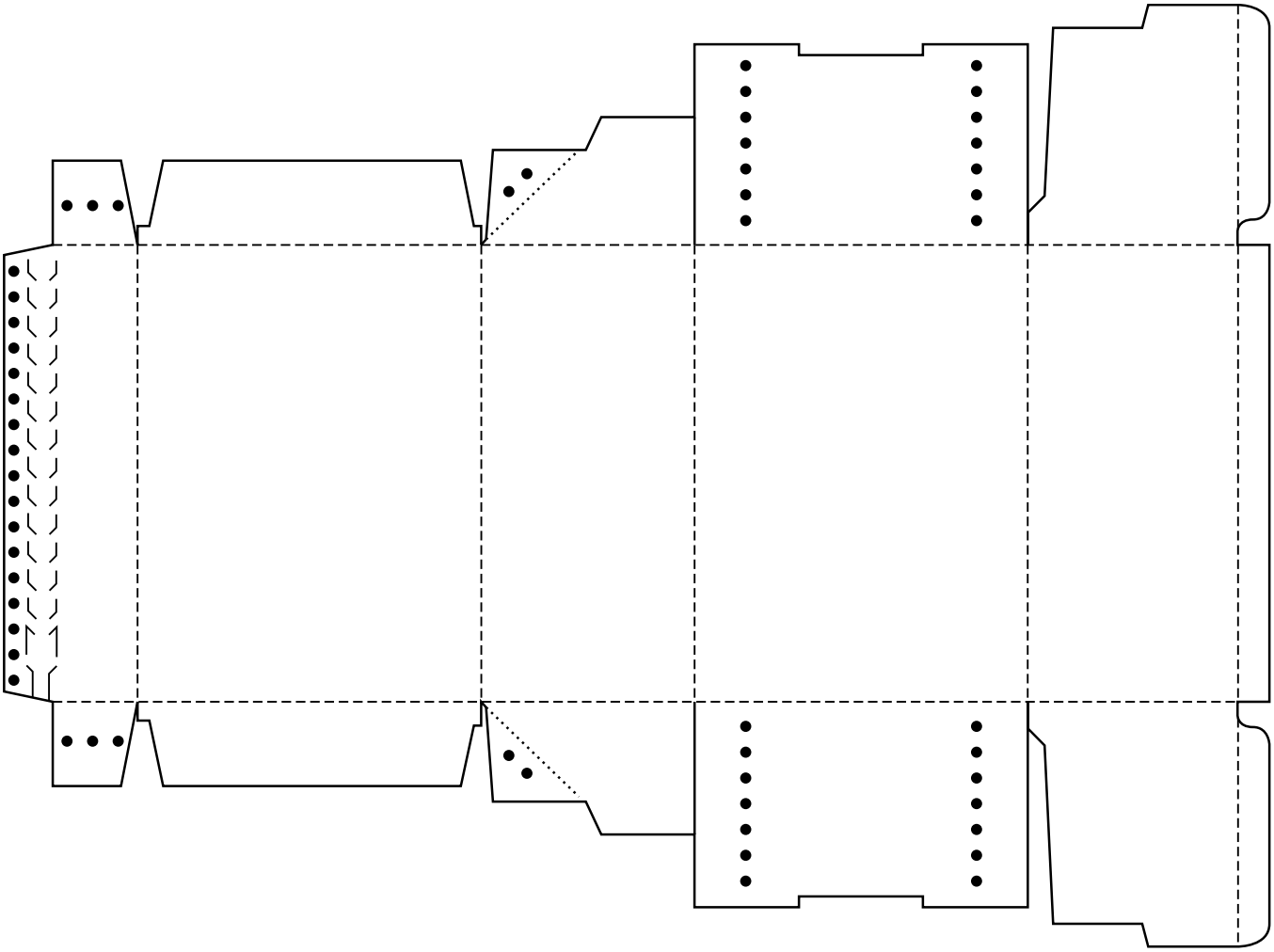


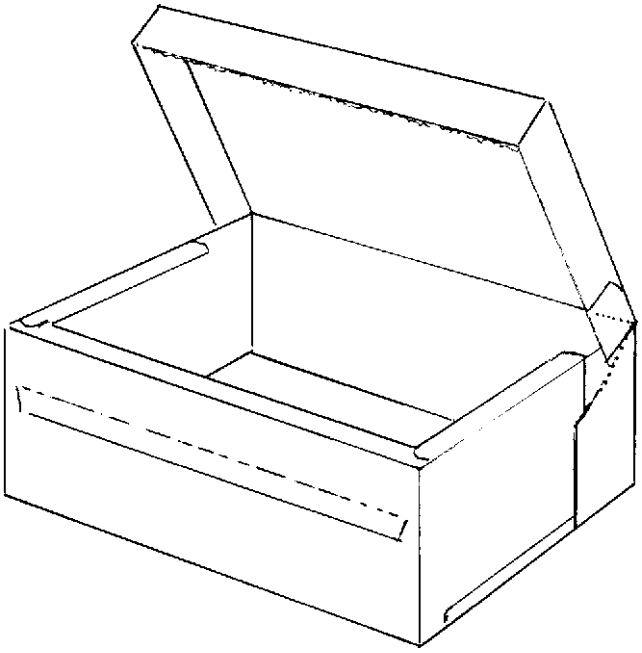






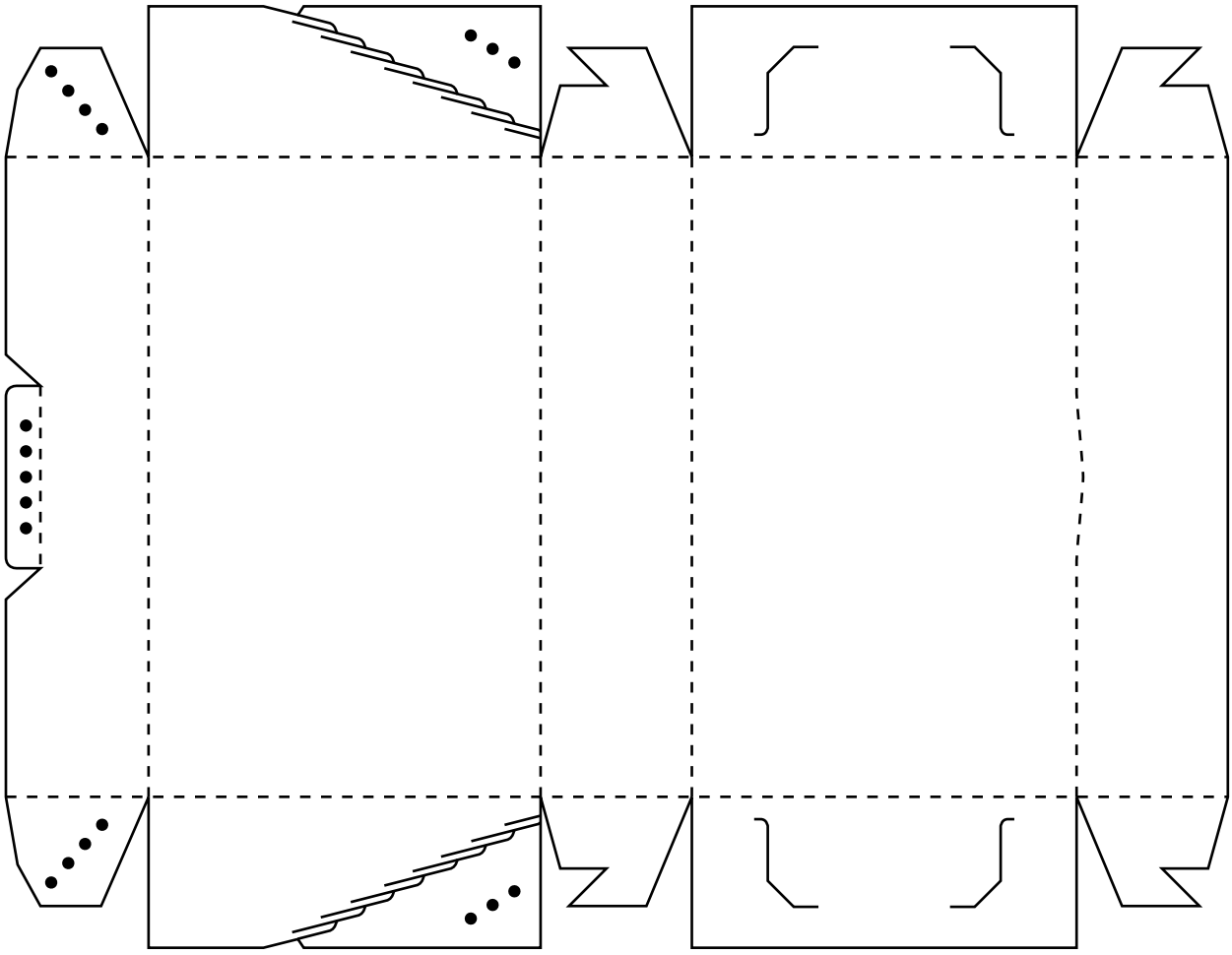
ICE CREAM CARTON

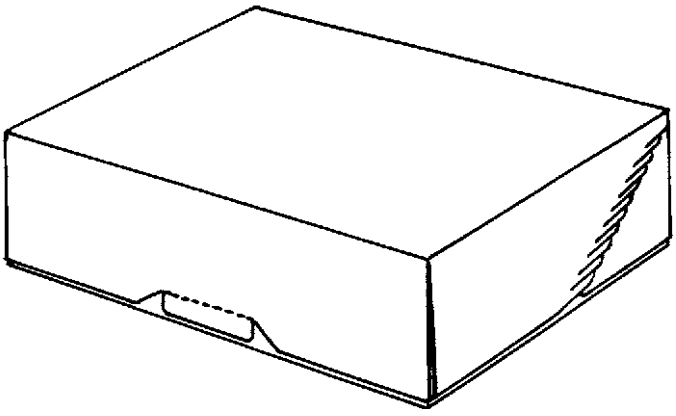




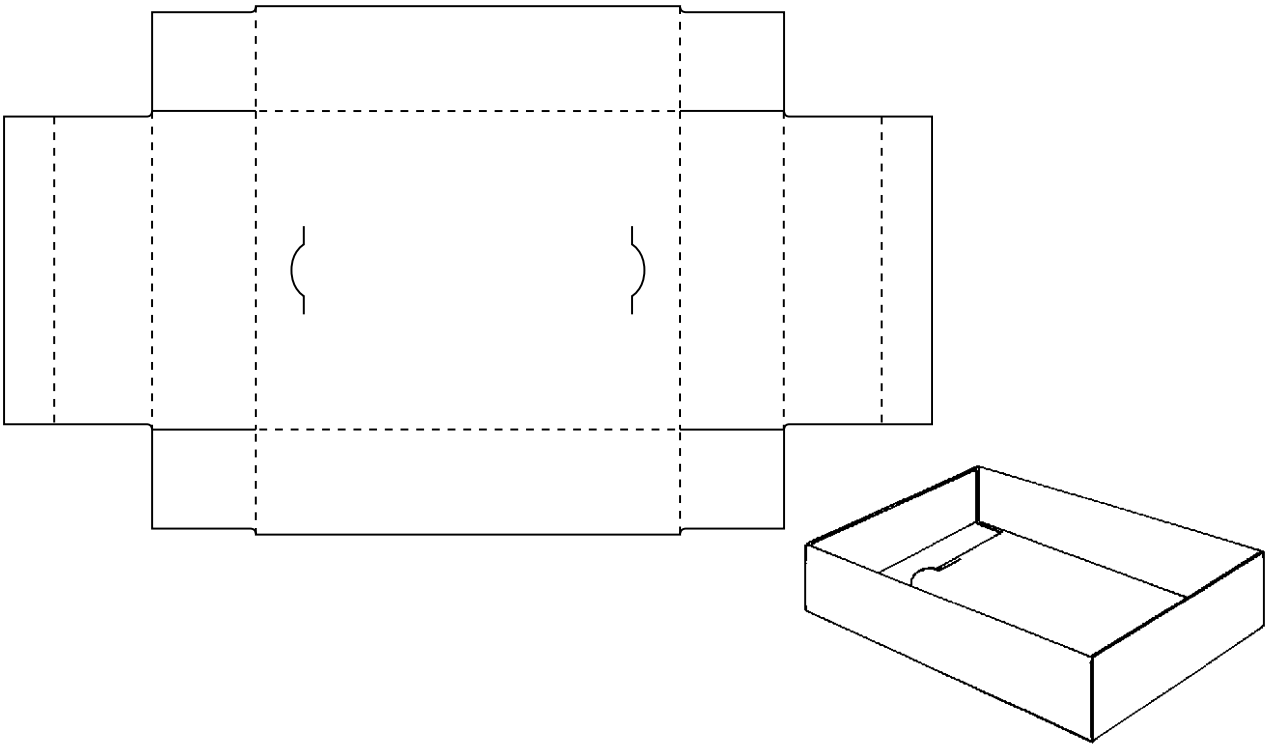
This ice cream carton variation has both perforated side deals and a zipper opening in front.

CORNER LOCK TRAY WITH TEAR-AWAY FEATURES ON LID SIDES AND FRONT

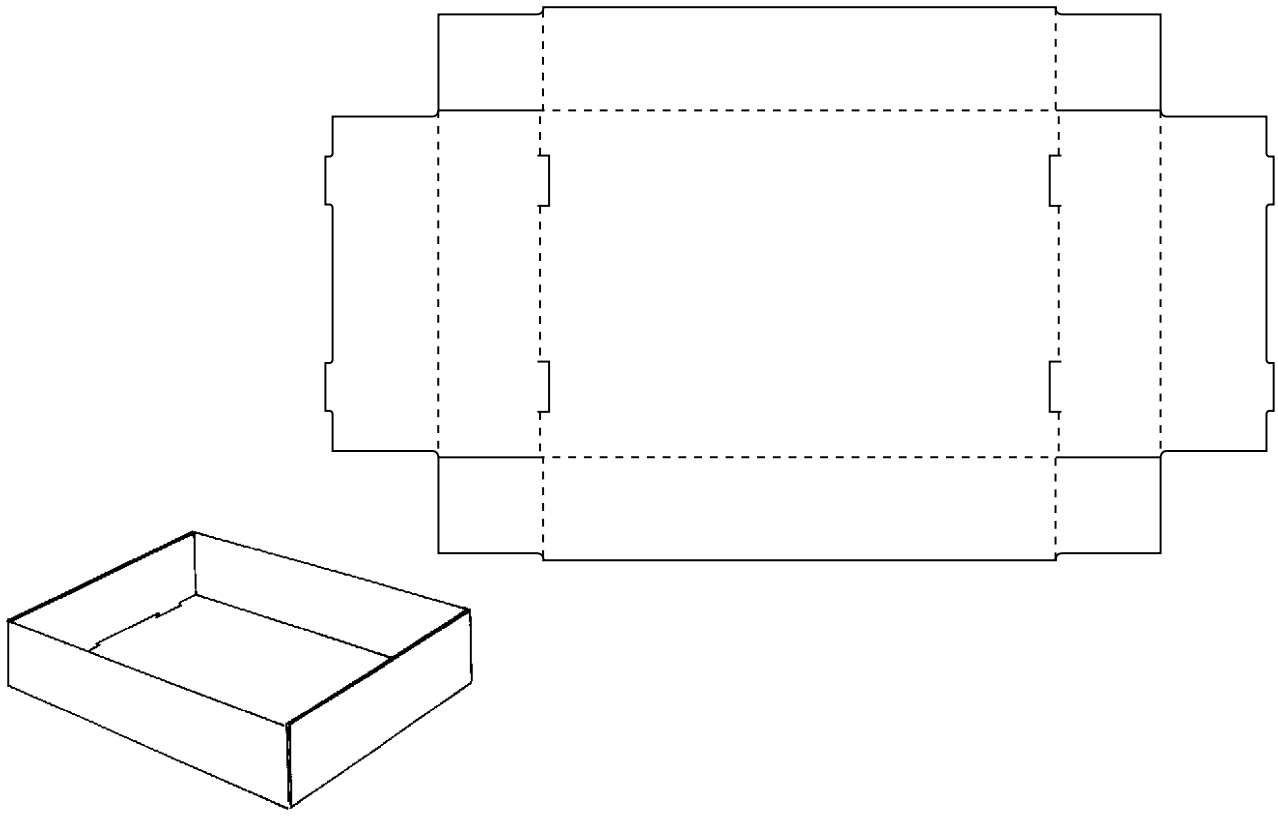


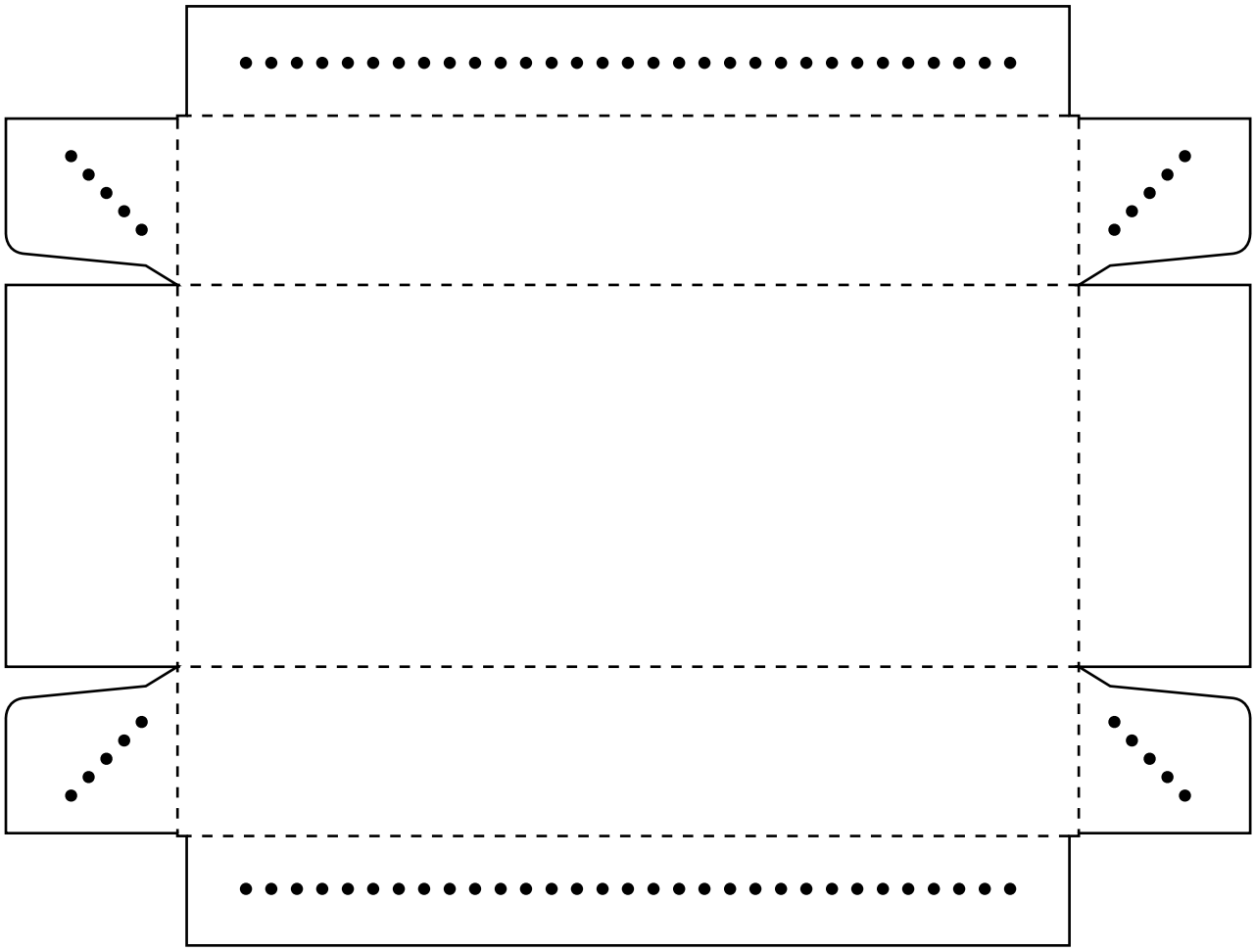


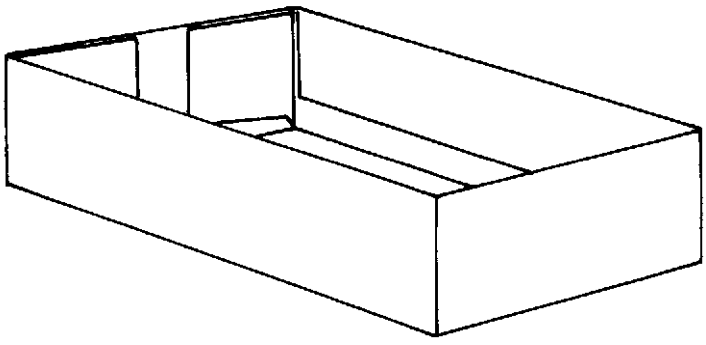
SINGLE SIDE WALL, DOUBLE END WALL PINCH LOCK TRAY



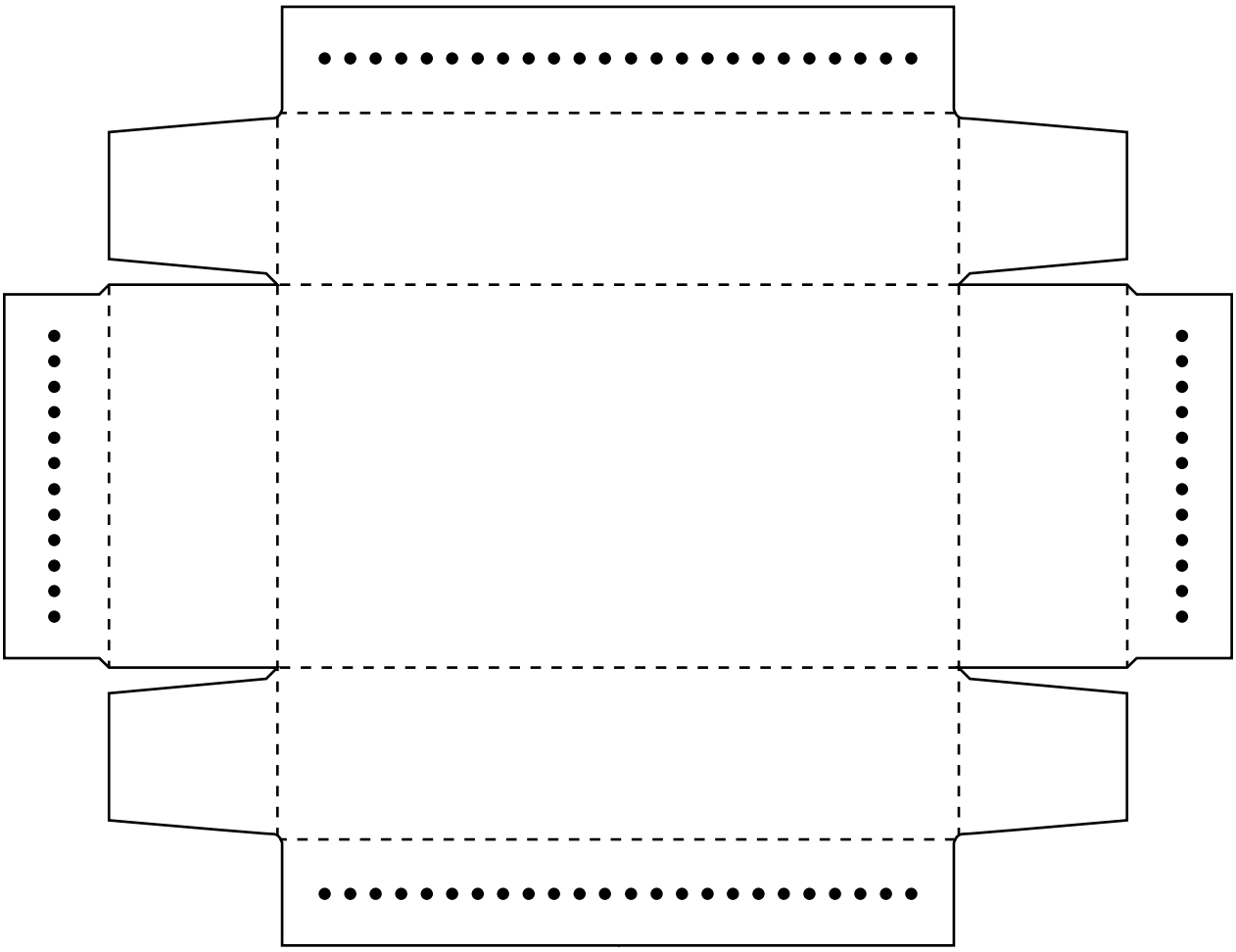
WALKER LOCK TRAY

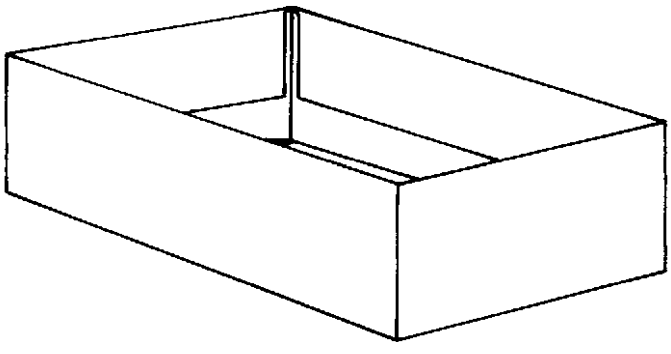


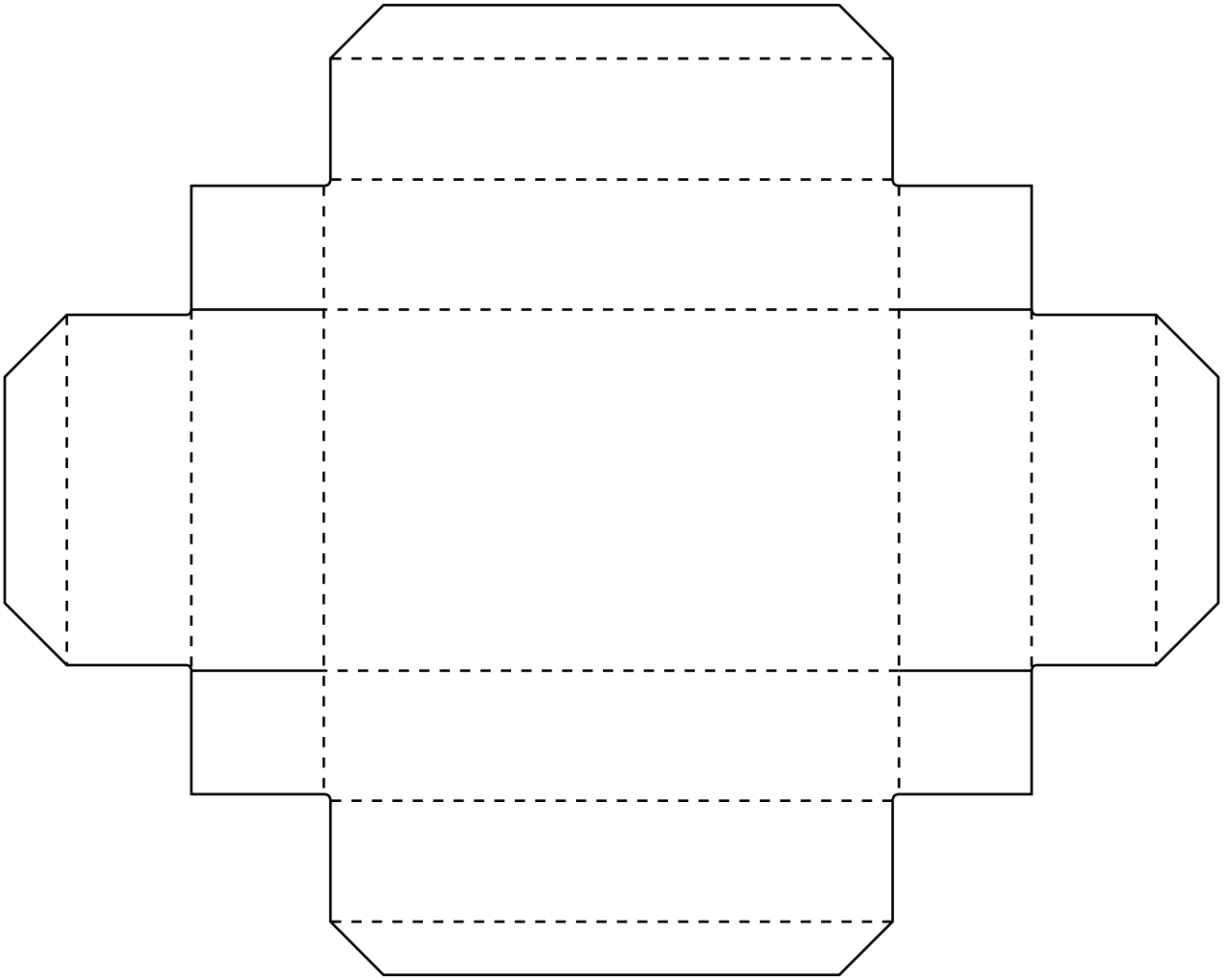


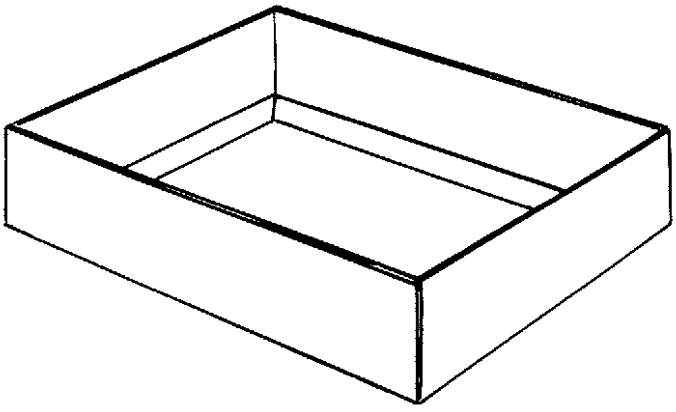


PARTIAL DOUBLE END WALL AND DOUBLE SIDE WALL TRAY

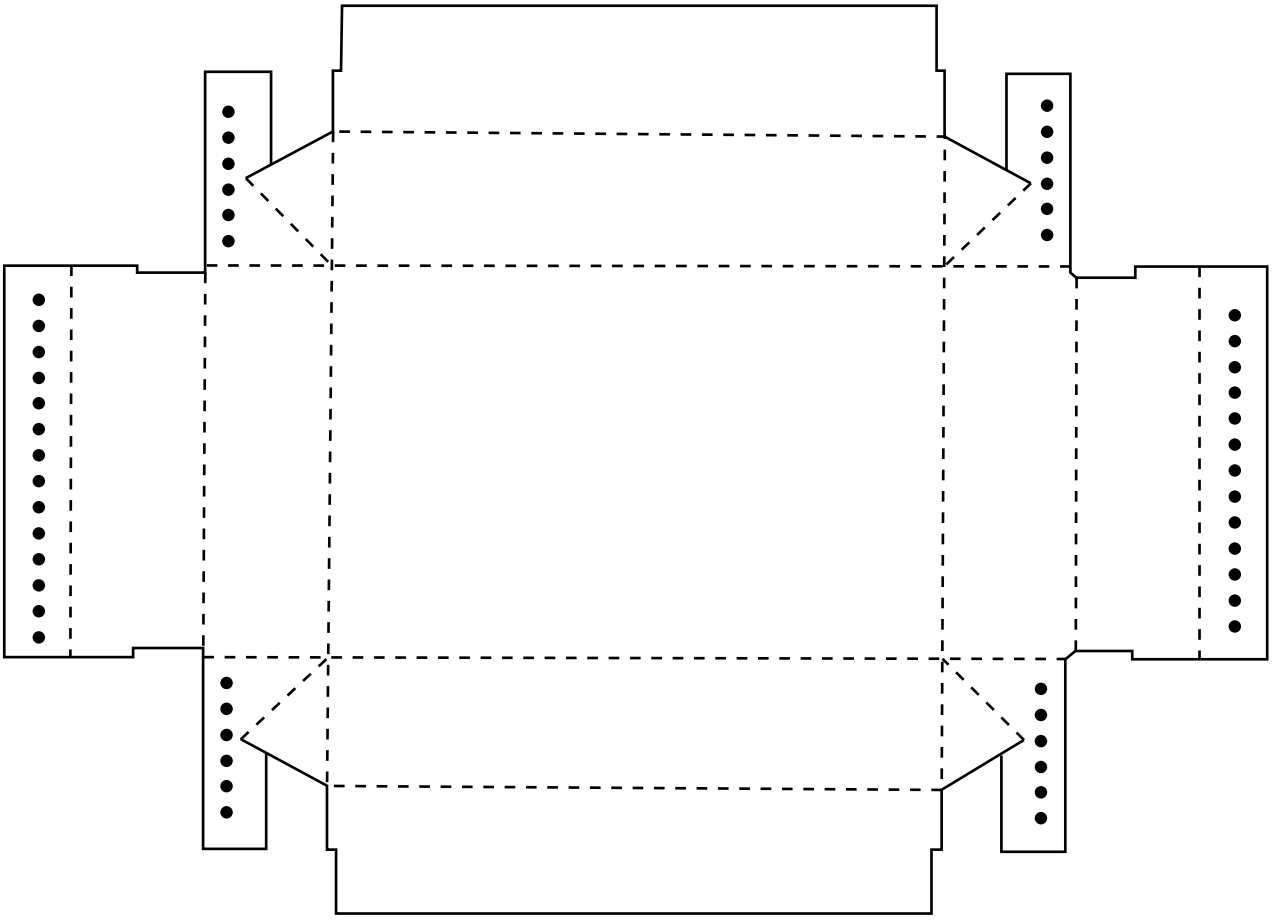


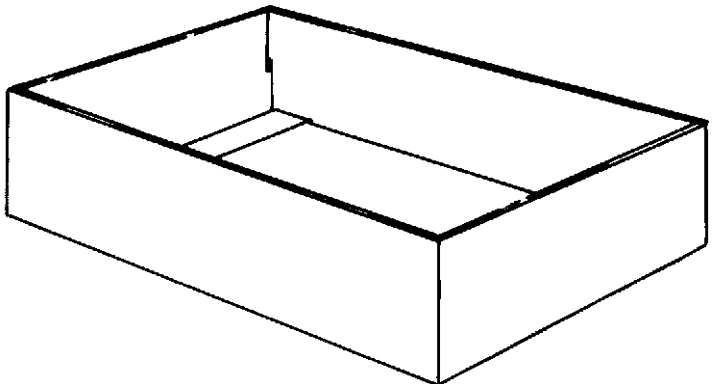


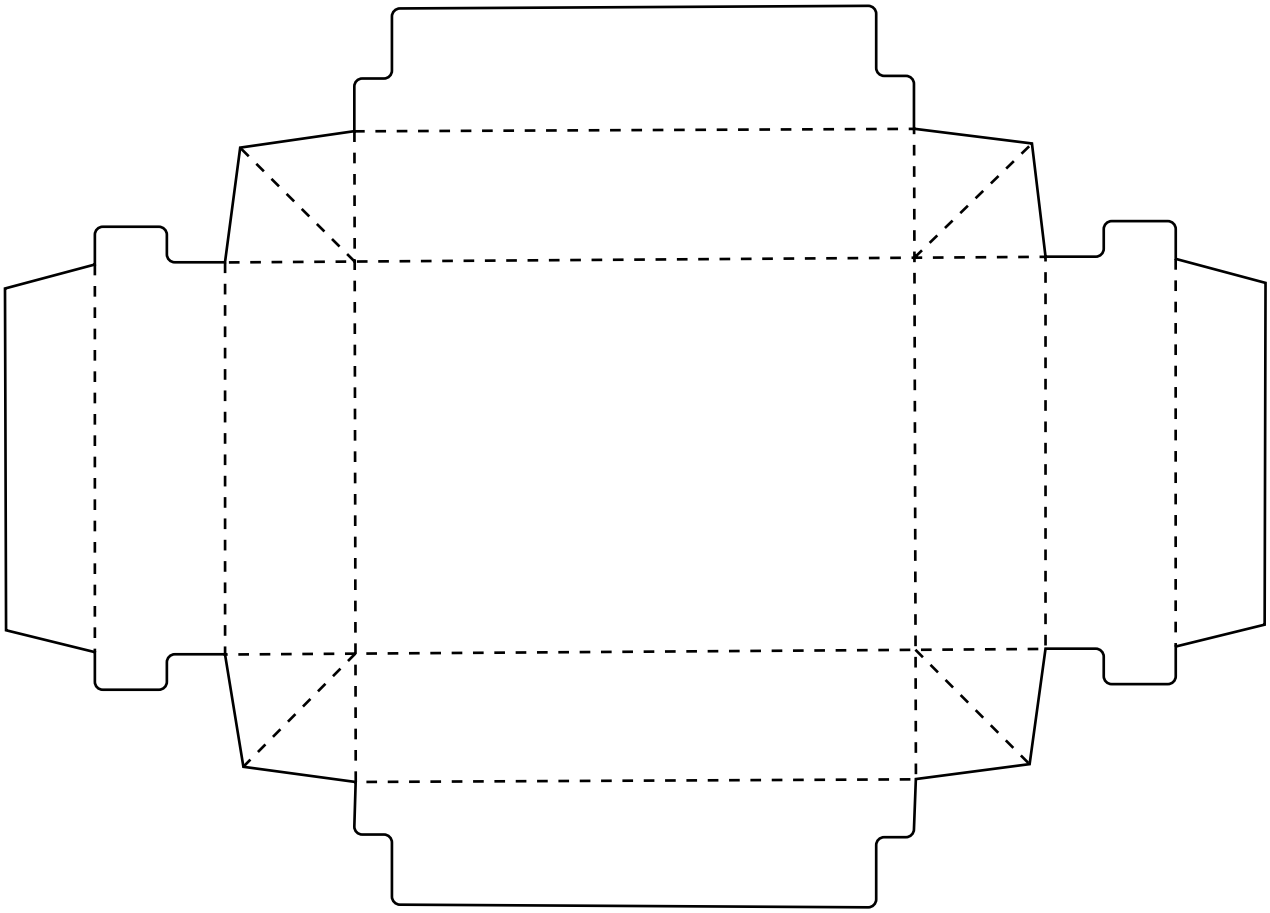


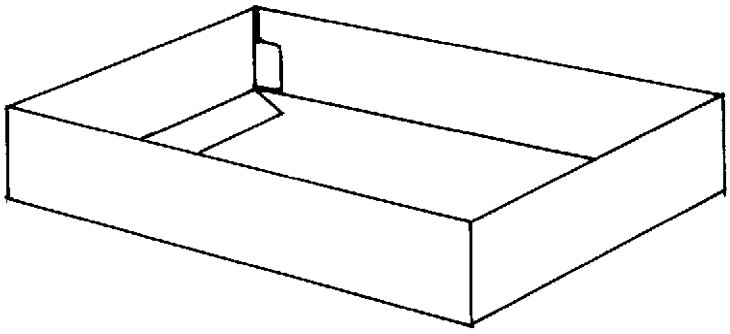


SIMPLEX STYLE TRAY WITH GLUED GUSSETS

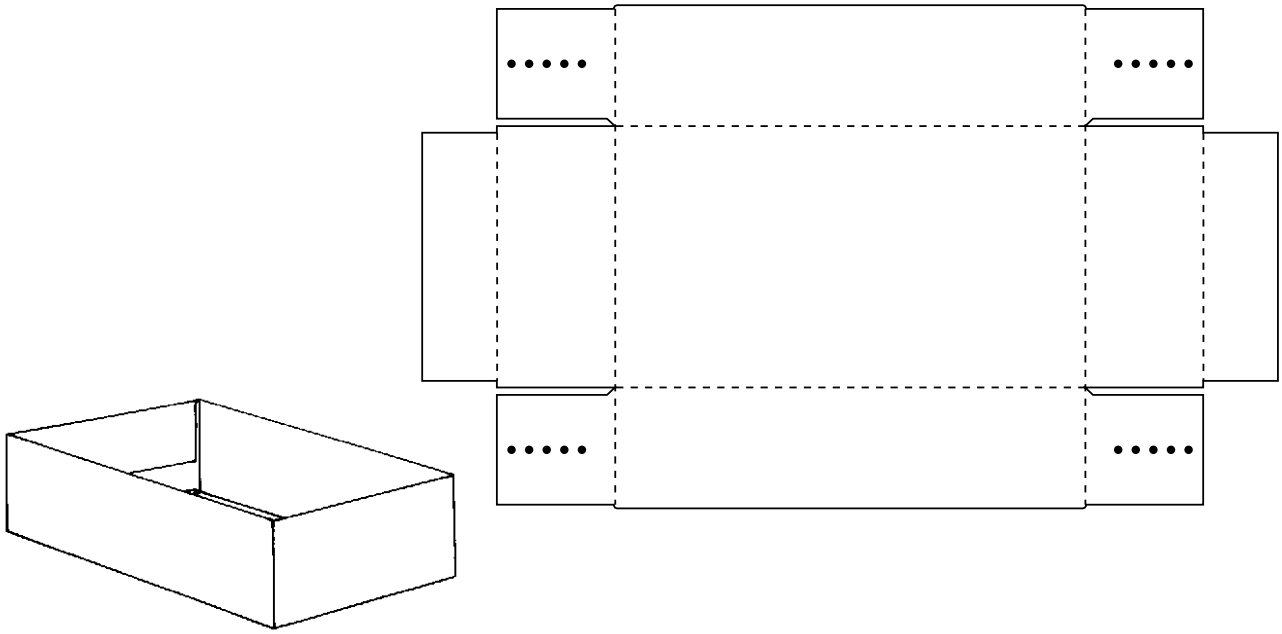




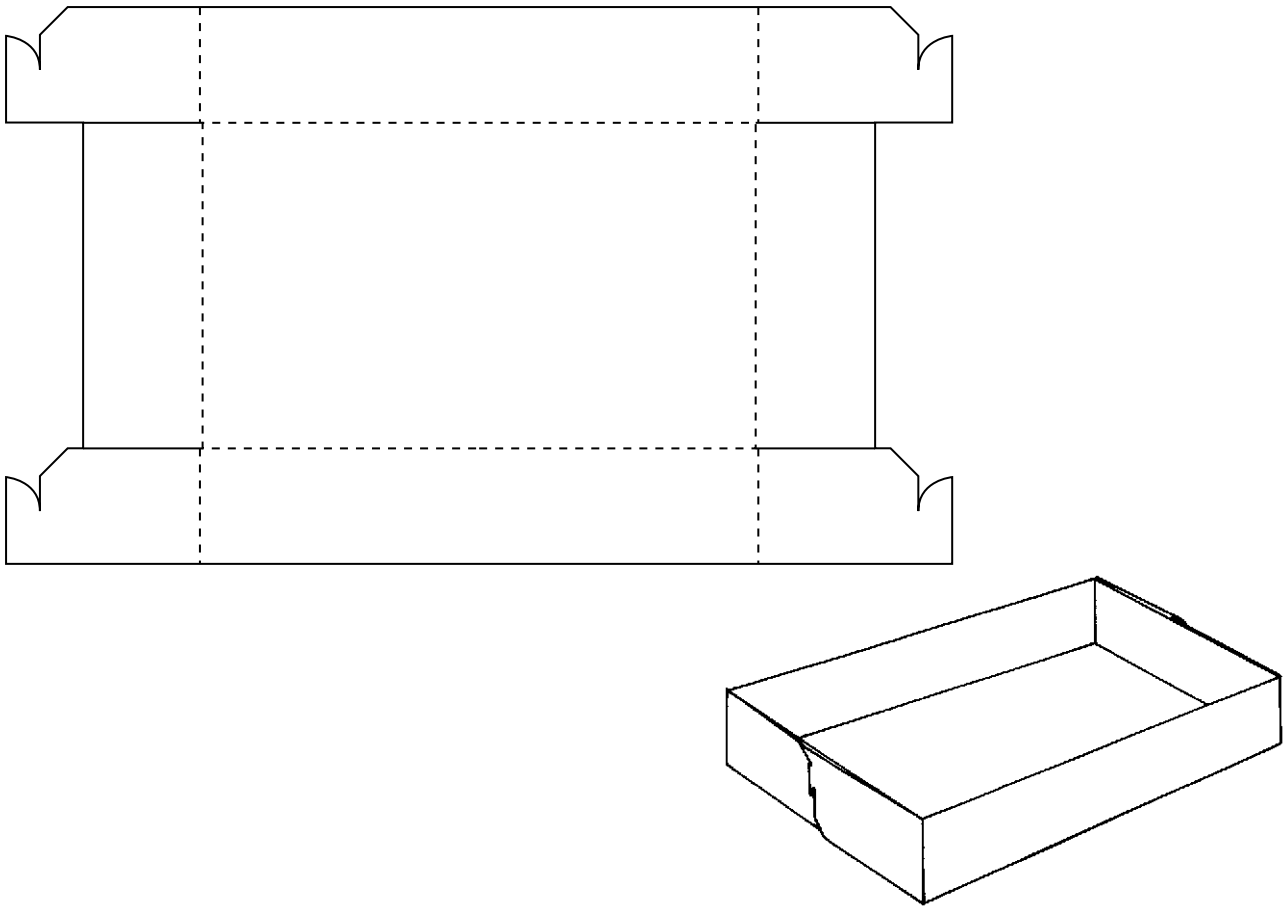


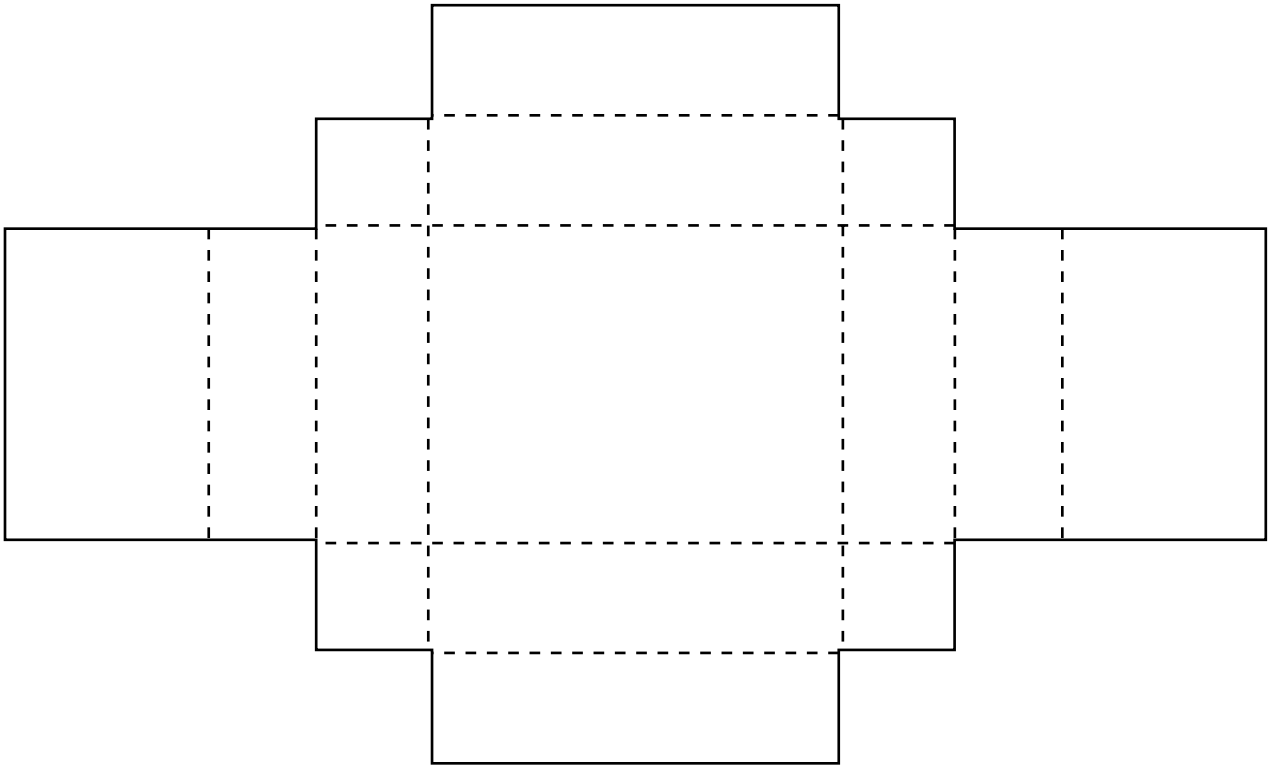


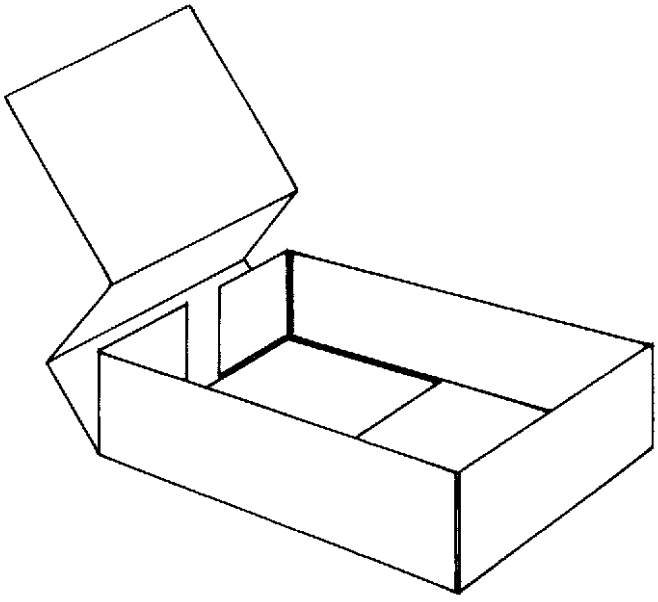
DOUBLE END WALL, SINGLE SIDE WALL TRAY



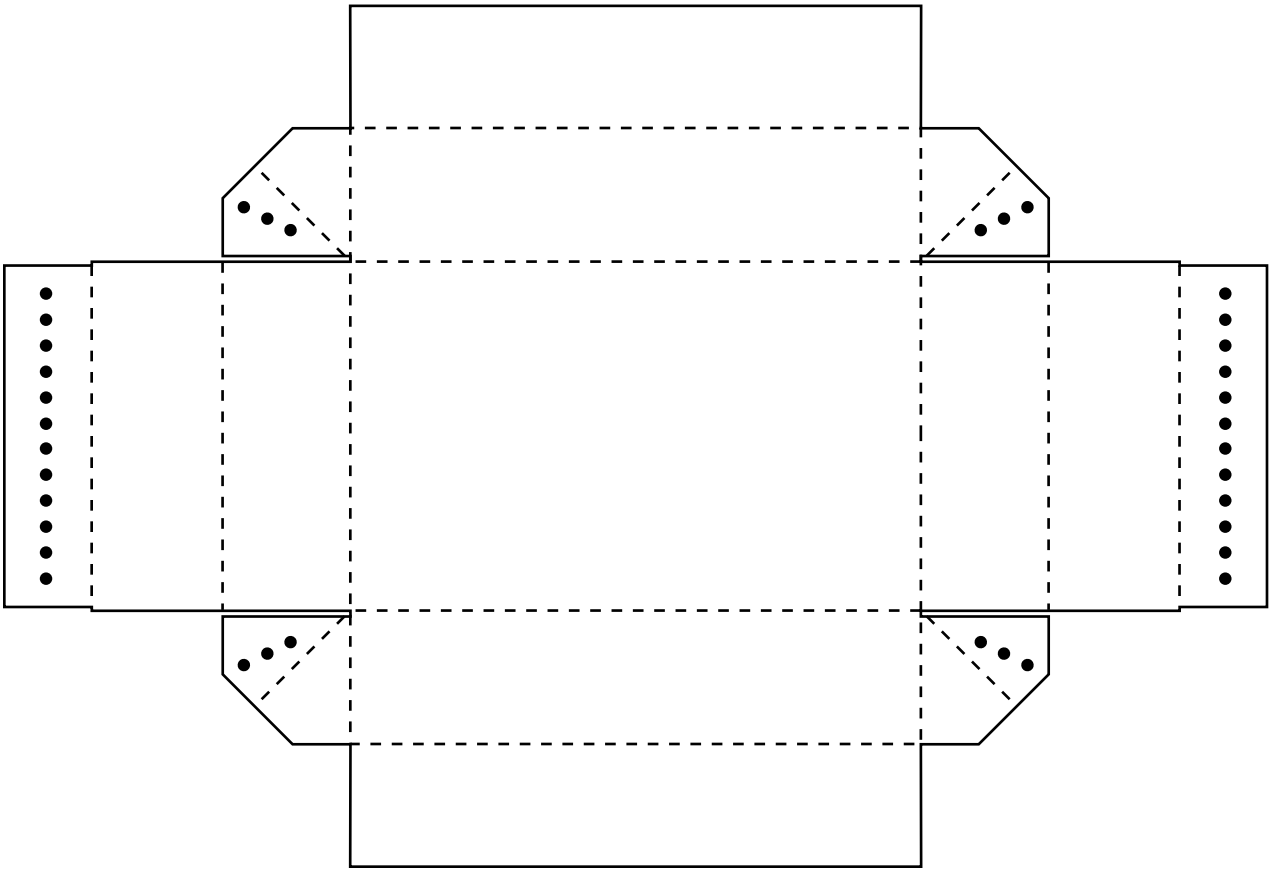
ARTHUR LOCK OR JONES LOCK TRAY

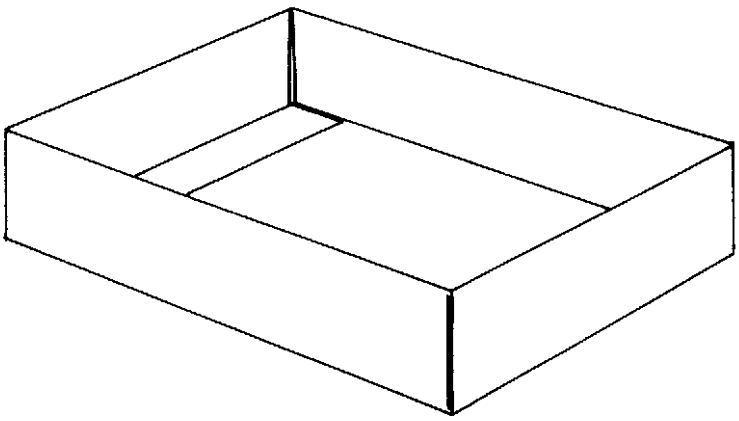




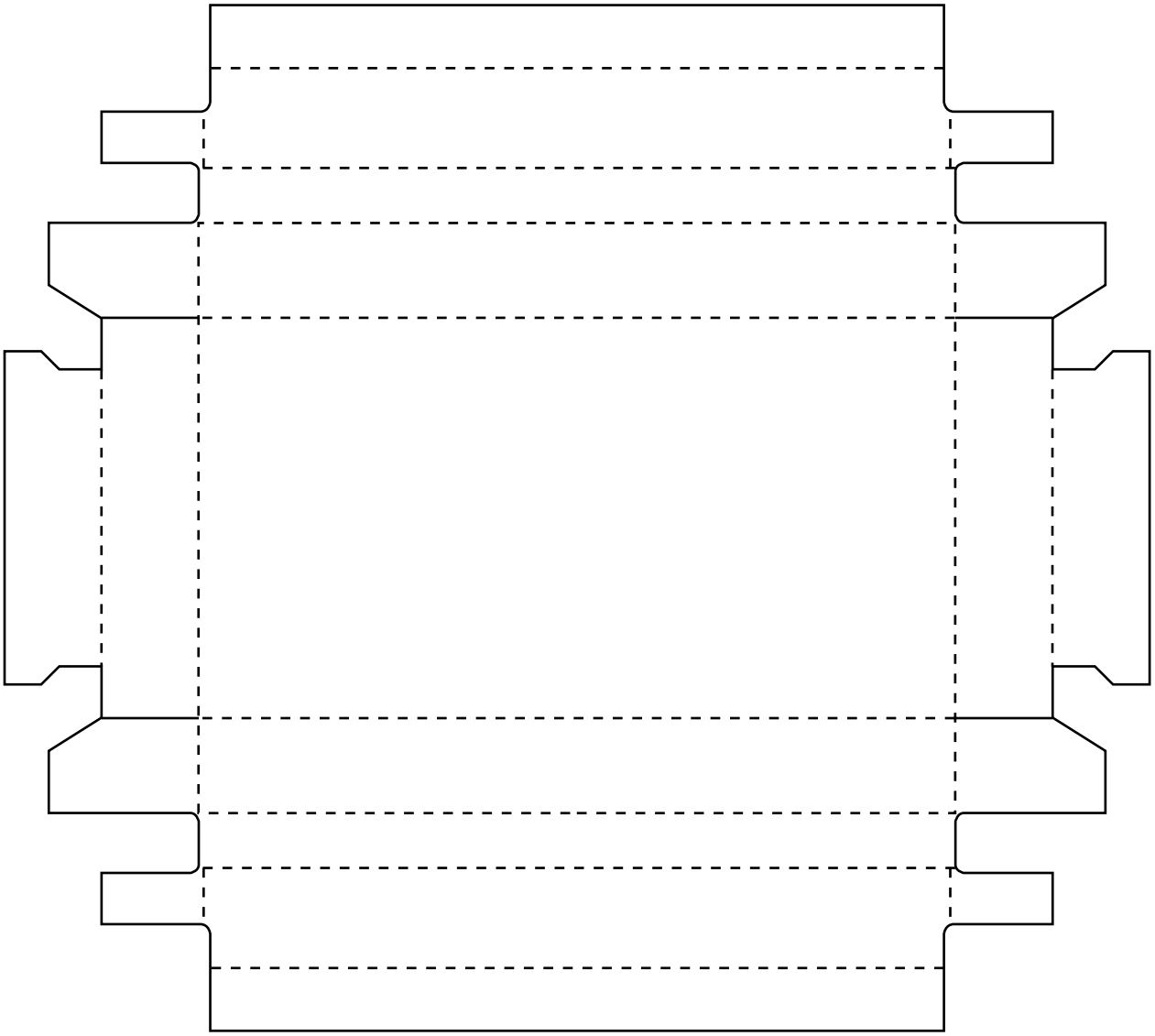


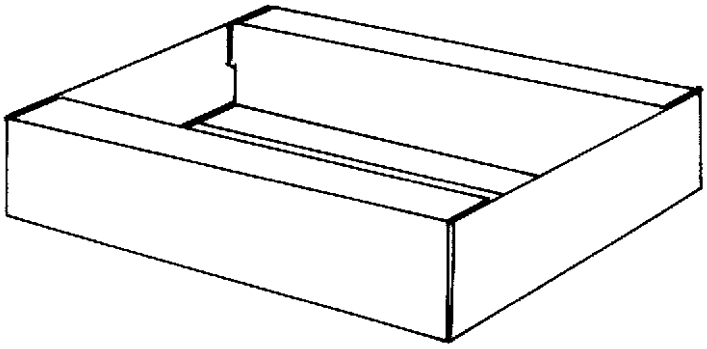
SIMPLEX STYLE TRAY, WEB CORNER SPOT-GLUED



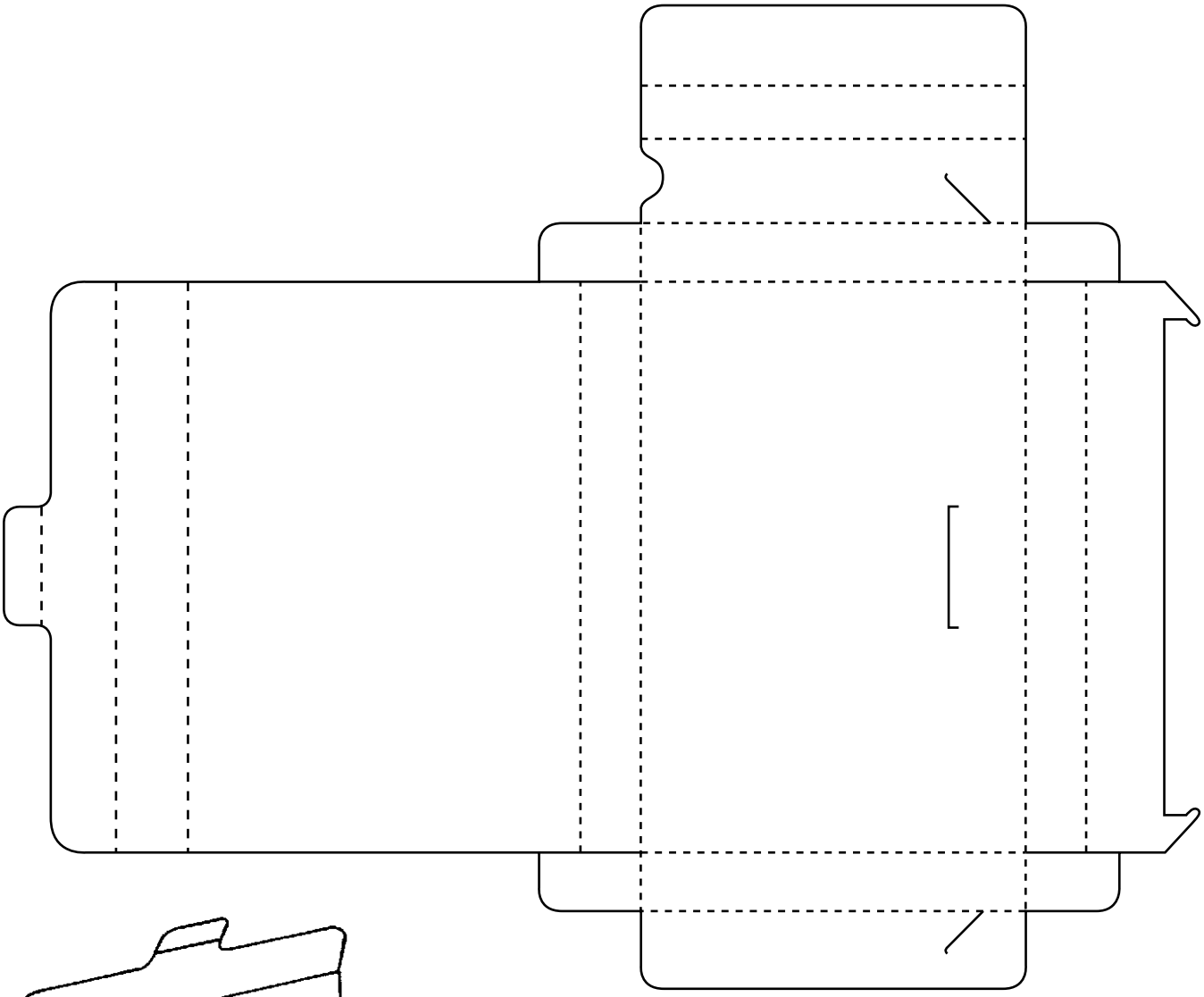


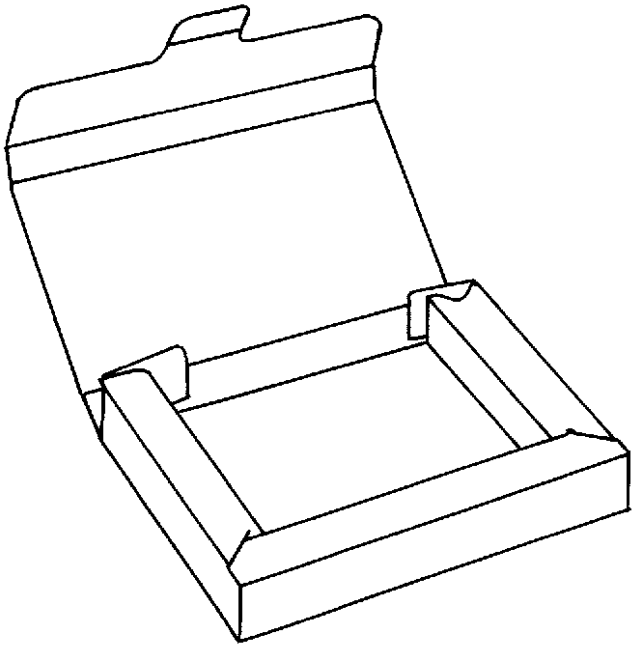
FRAME VIEW TRAY (VARIATION)



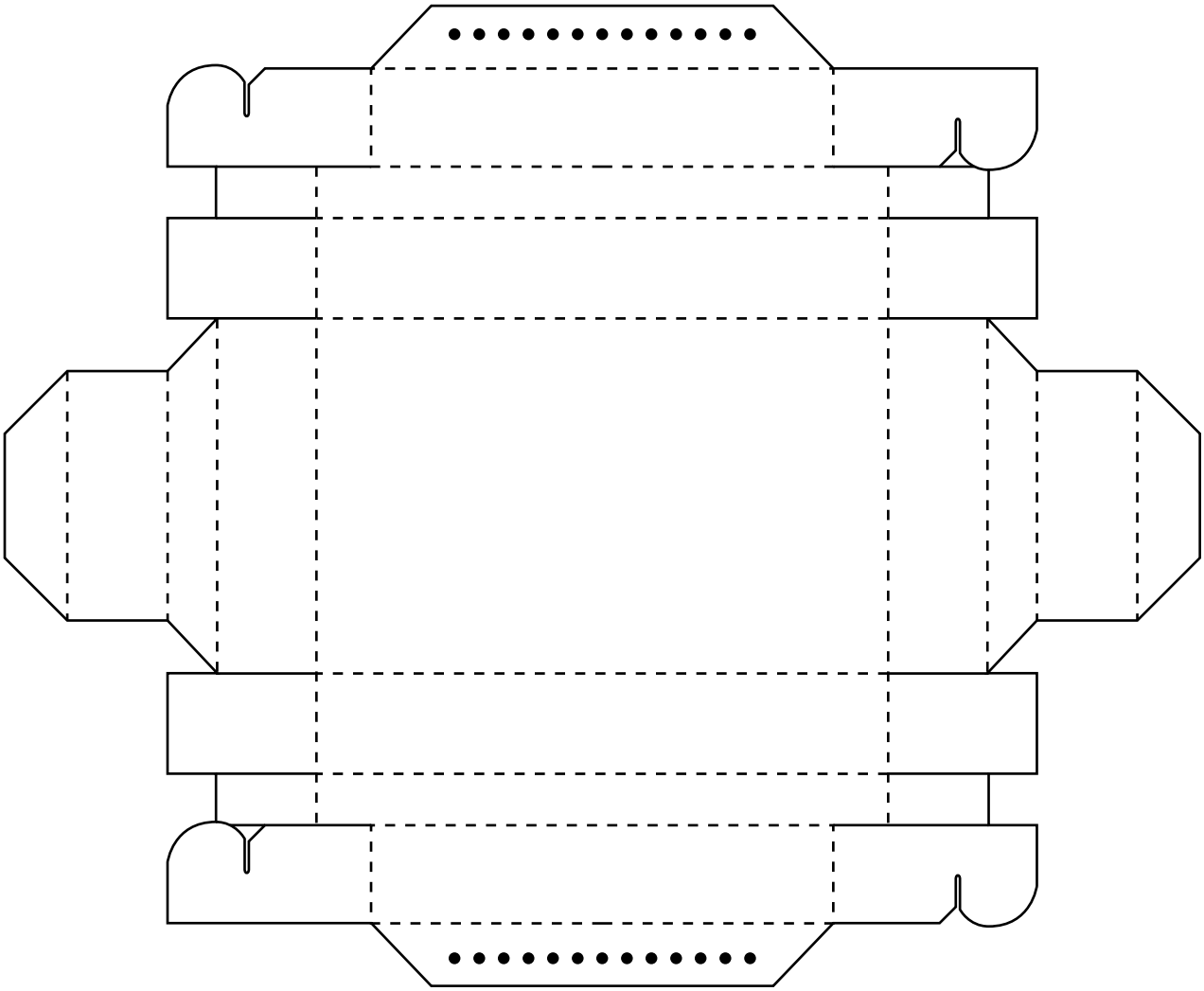


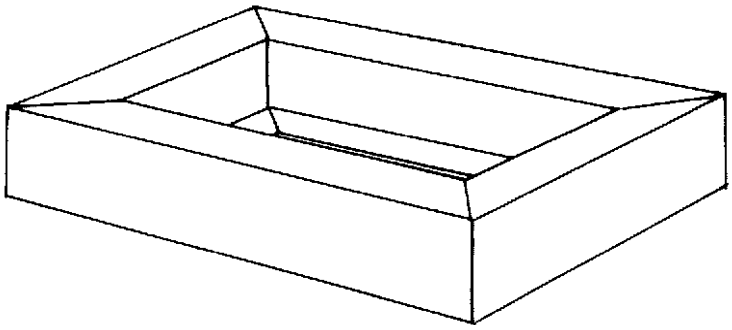
FRAME VIEW TRAY (VARIATION 1)



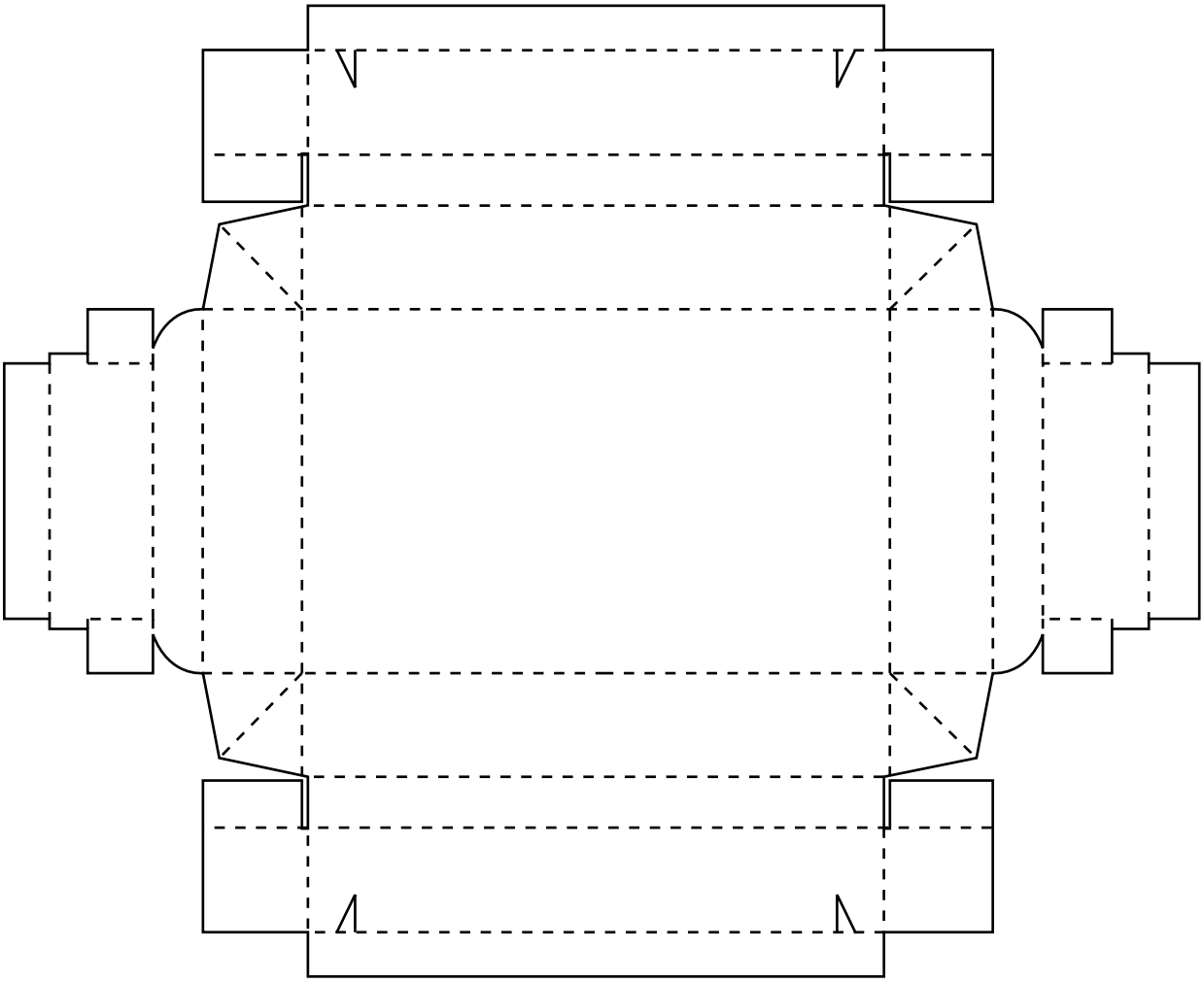


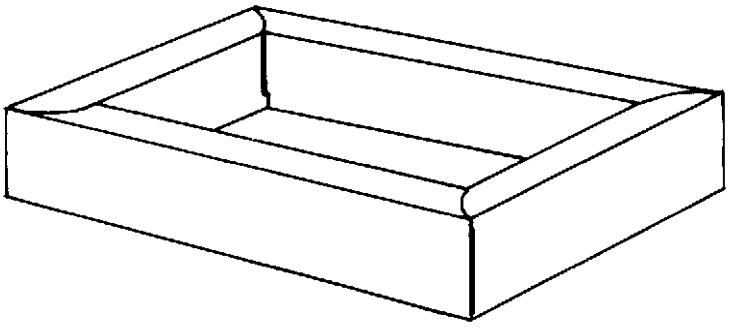
This tray was used for crafts projects and features an enclosed compartment for small parts.



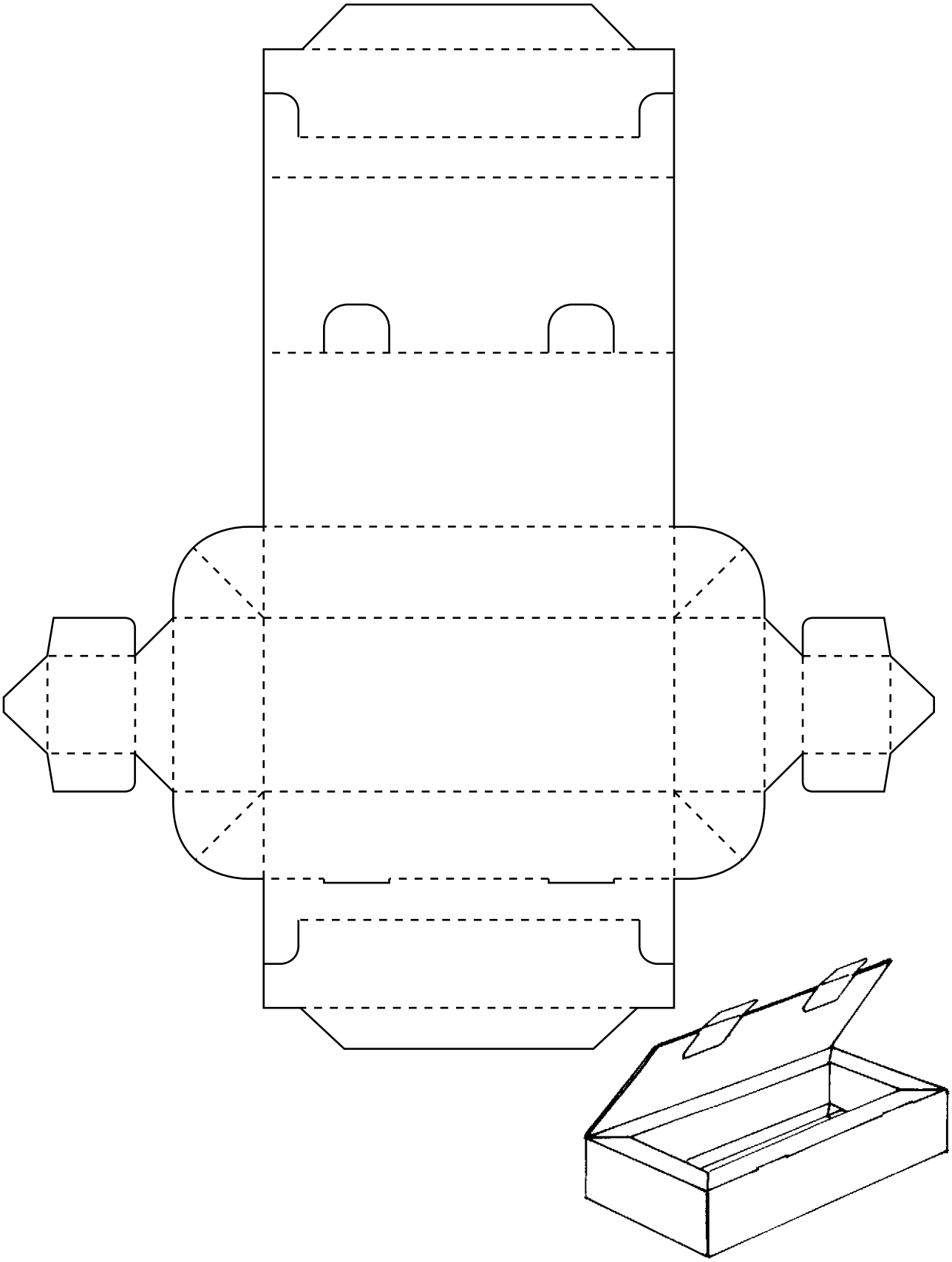


FRAME VIEW TRAY (VARIATION 4)

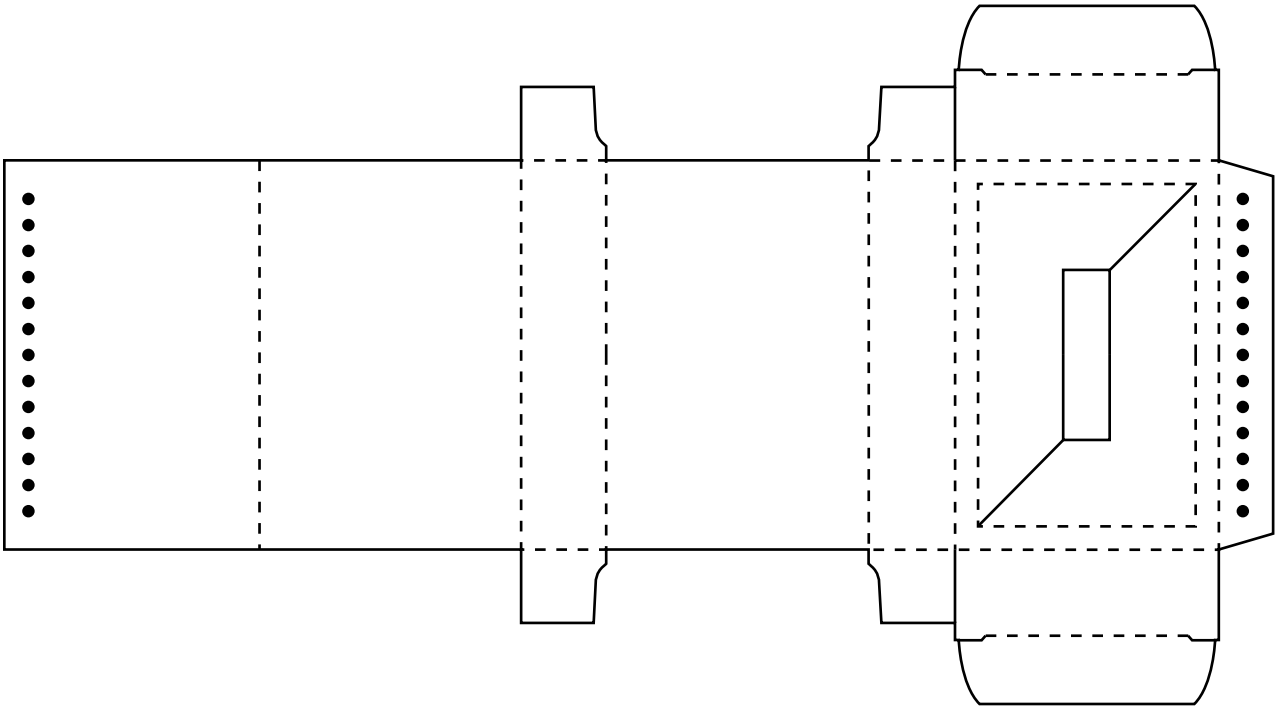


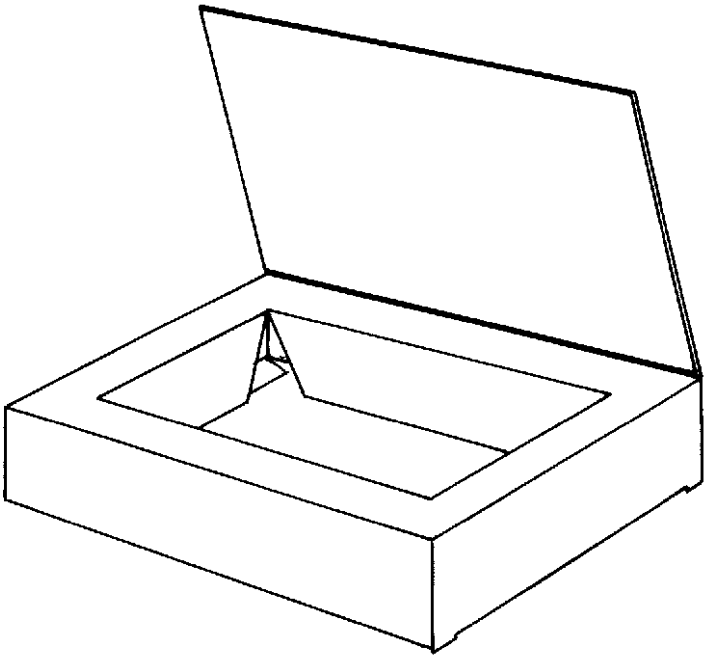


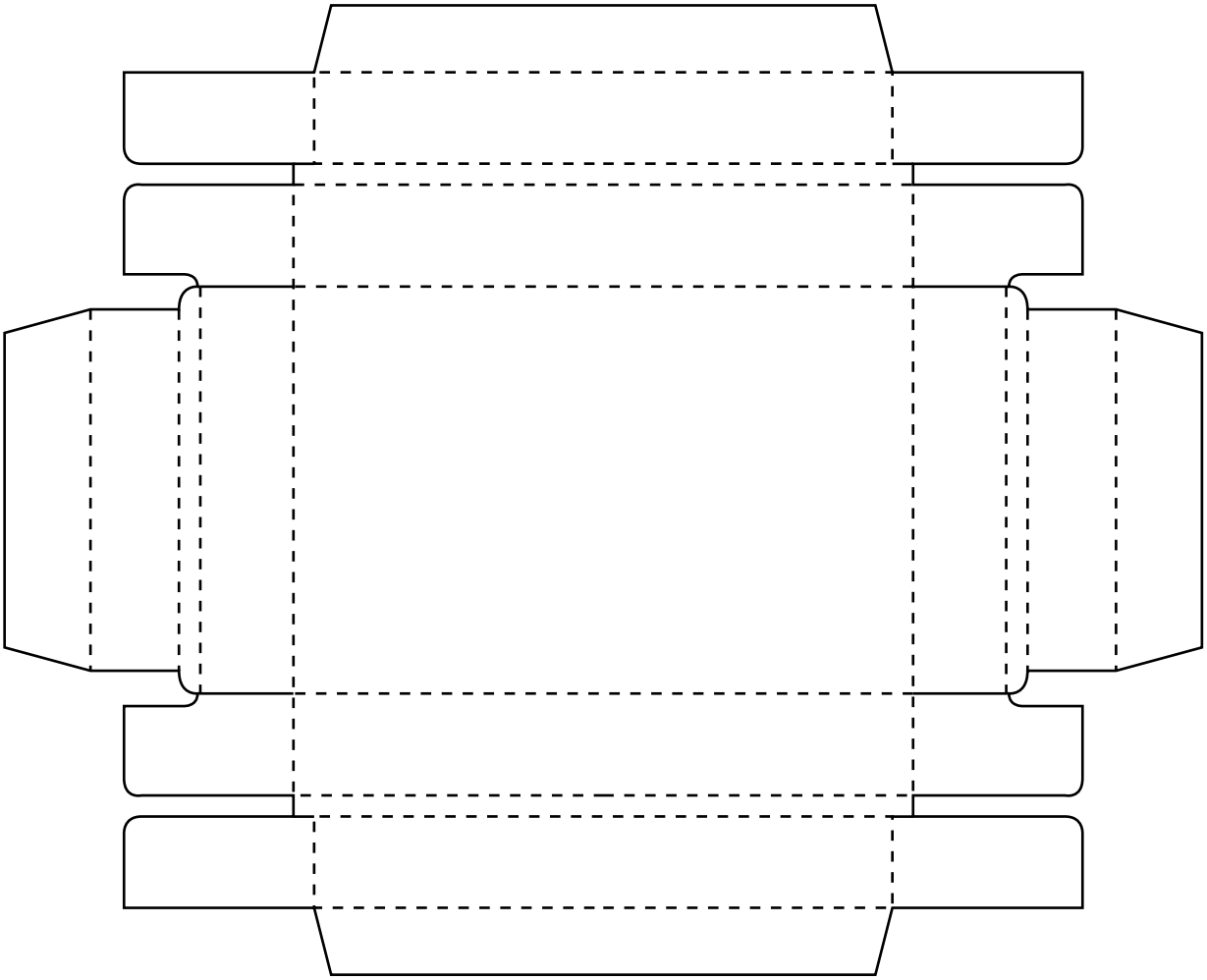
FRAME VIEW TRAY WITH LID WITH LOCK TABS

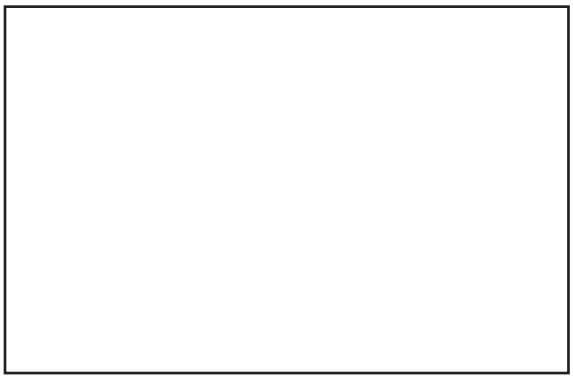


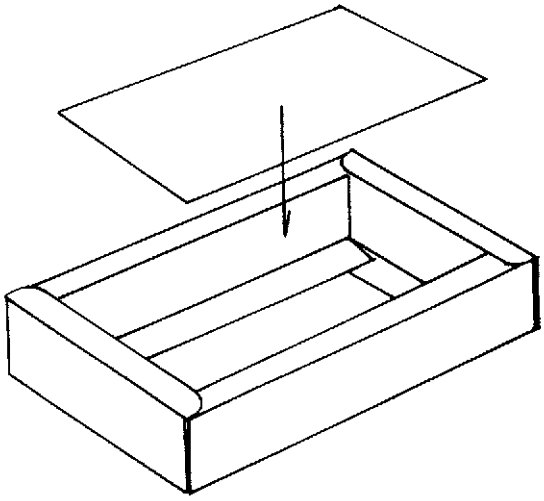
FRAME VIEW TRAY WITH DOUBLED COVER



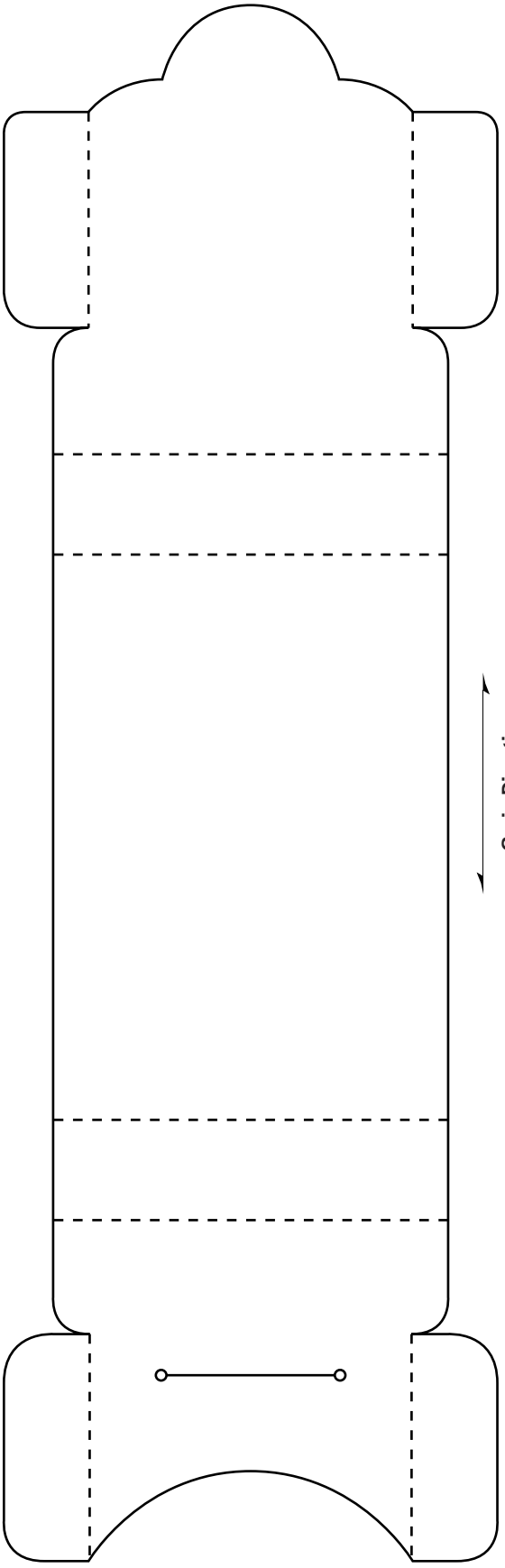




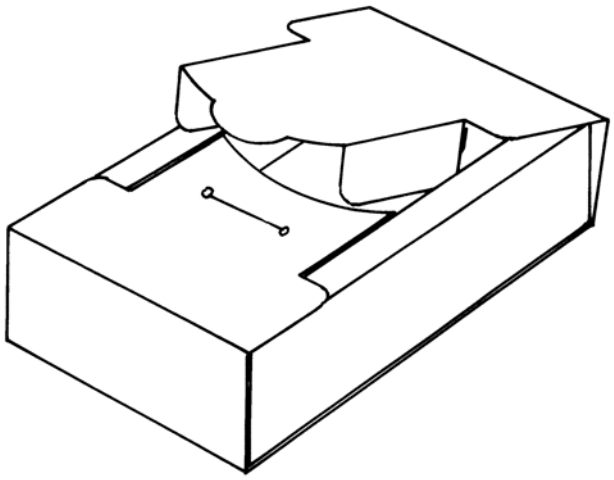




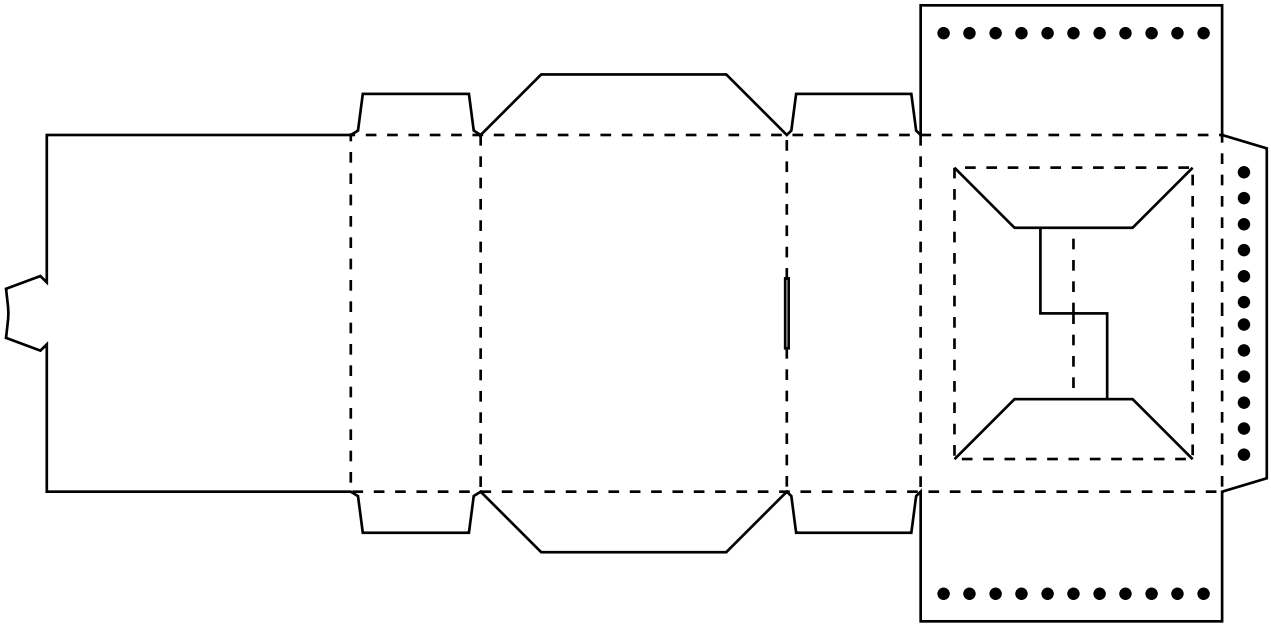
Combined with the overwrap pattern on the following page, this package lends itself to numerous graphic possibilities.

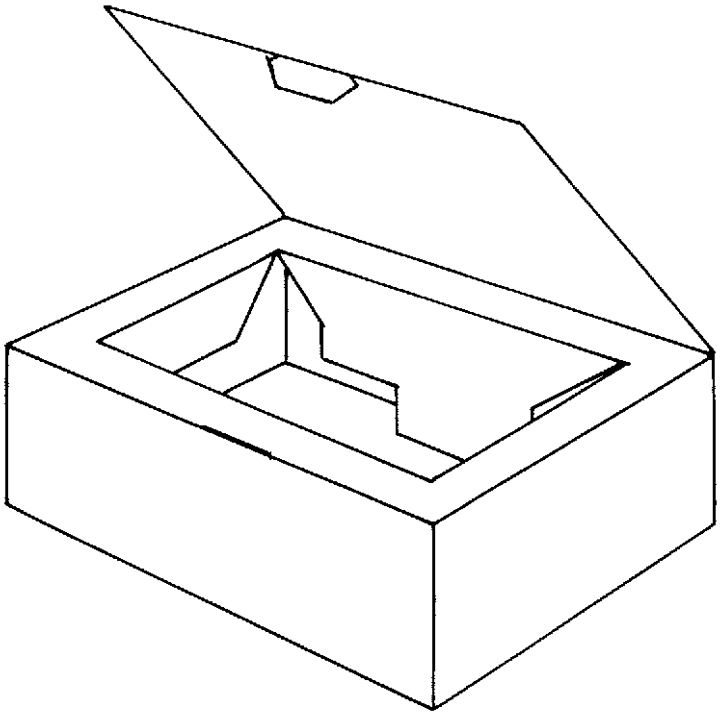


This wrap fits around the view tray of the preceding page; the four flaps fit neatly inside the tray.

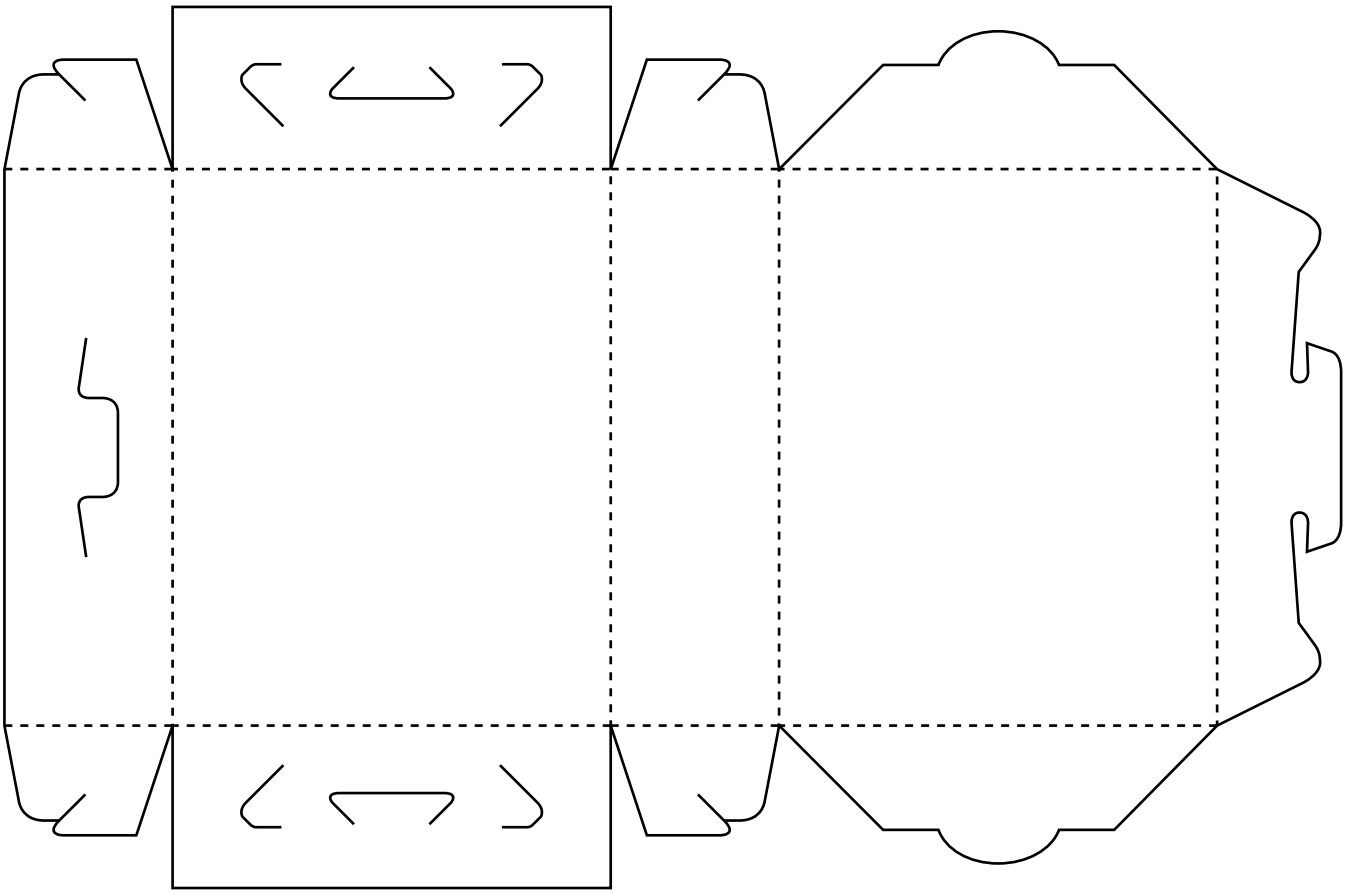


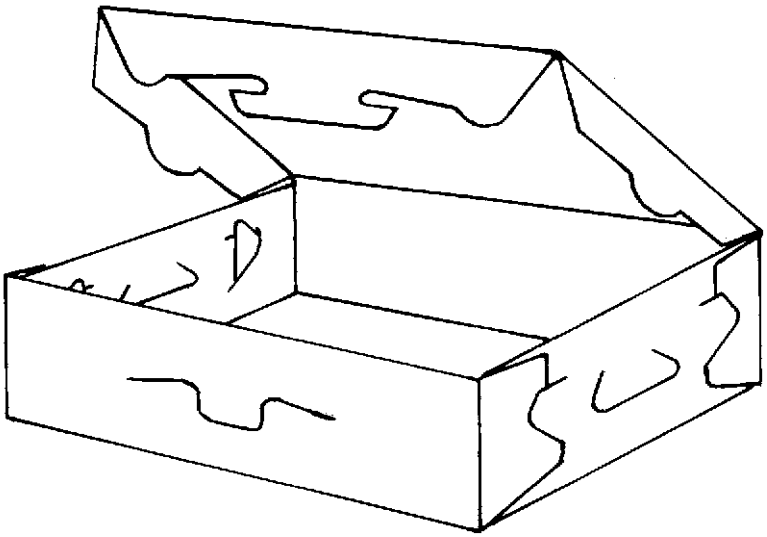
FRAME VIEW TRAY WITH COVER AND LOCK TAB

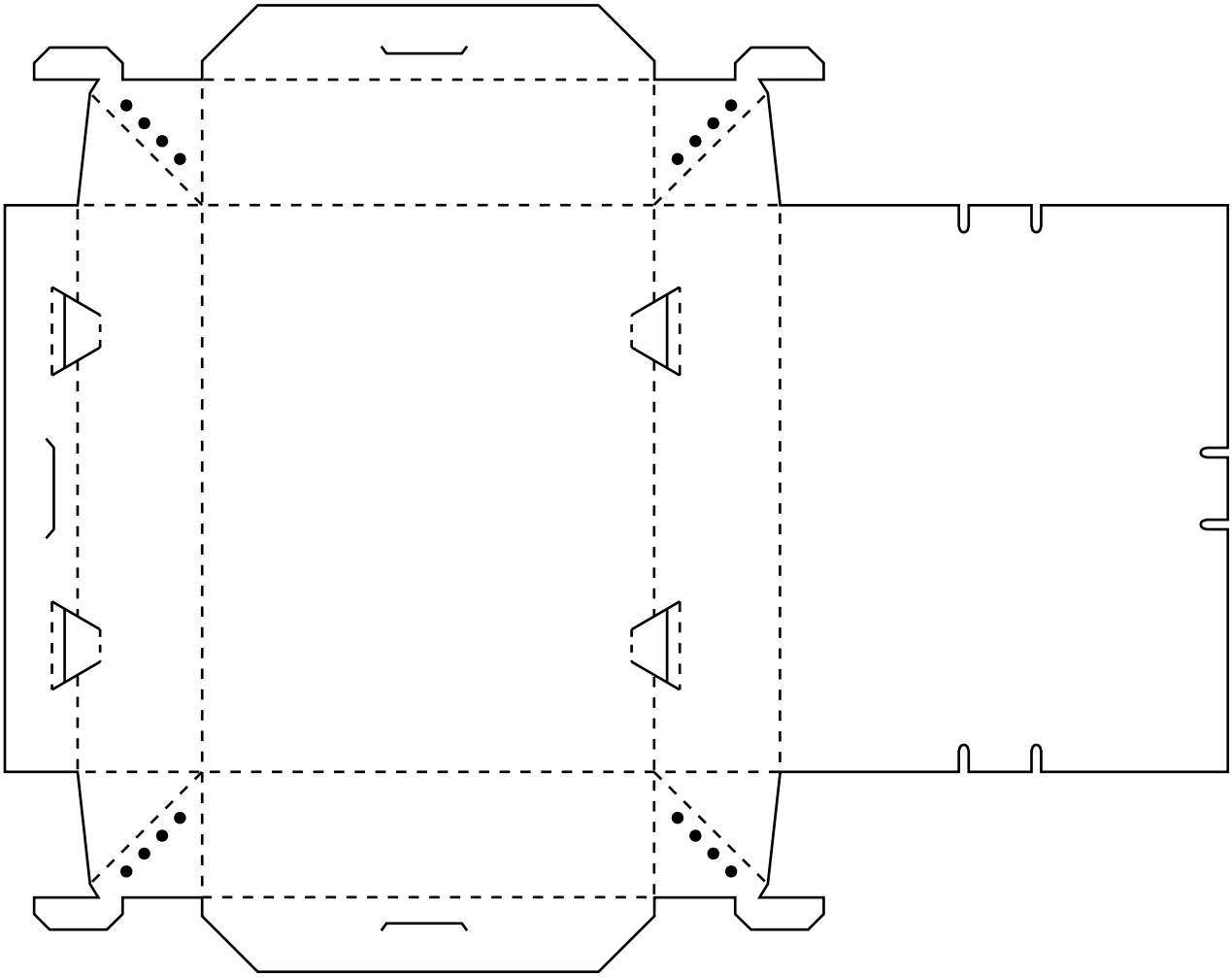


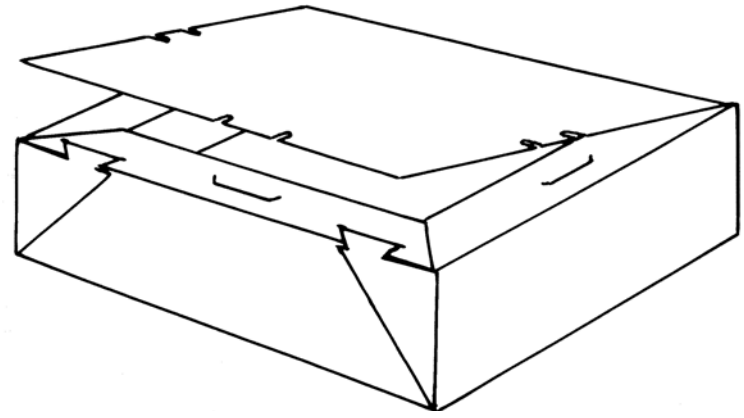


KLIKLOK® "CHARLOTTE" STRIPPER LOCK TRAY WITH HINGED COVER
AND ANCHOR LOCK AND SIDE LOCKS

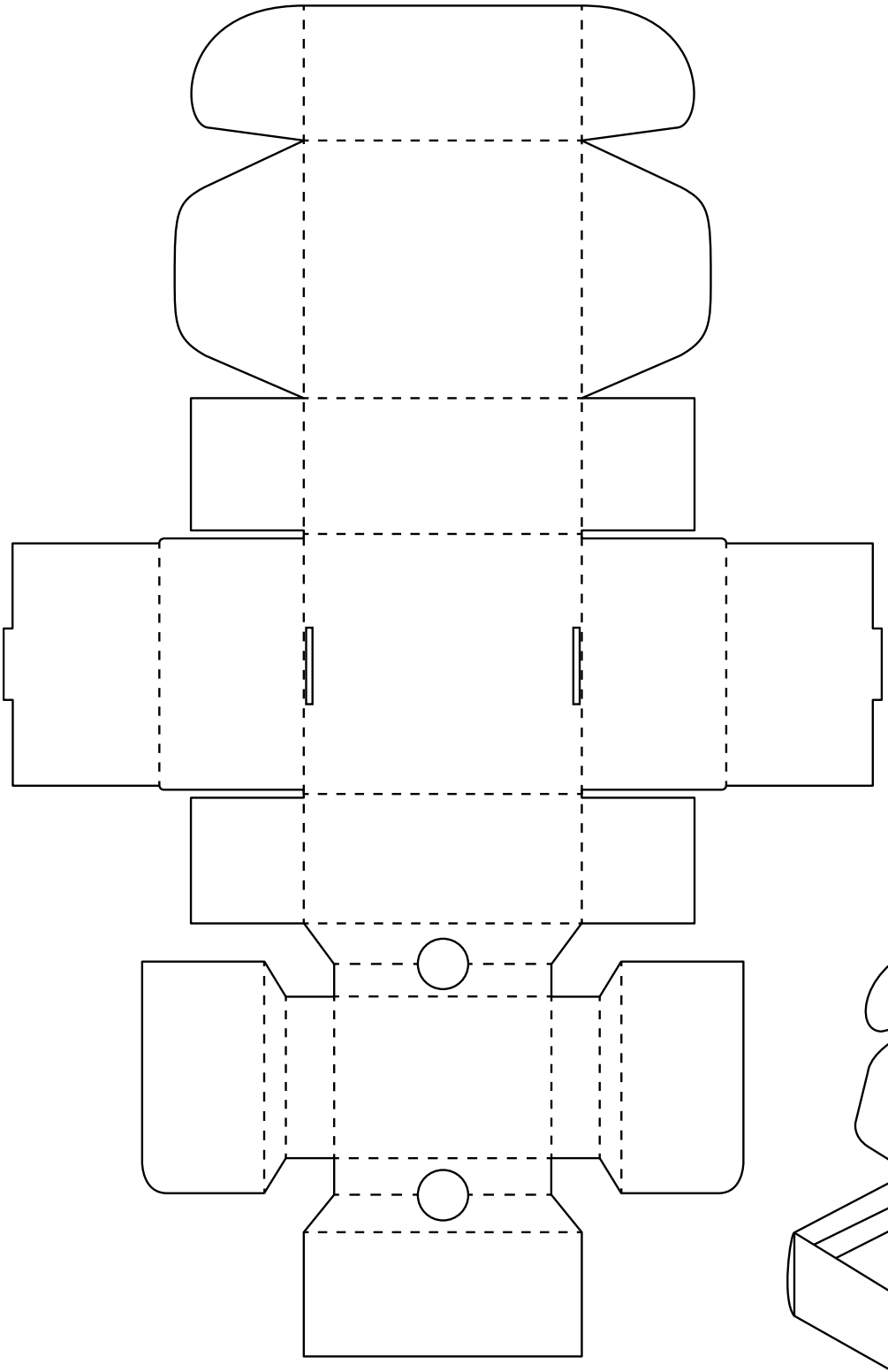


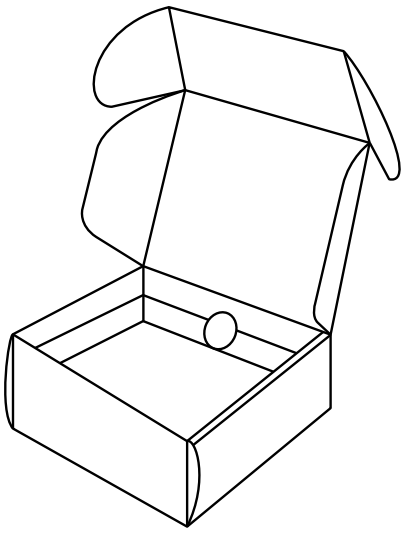


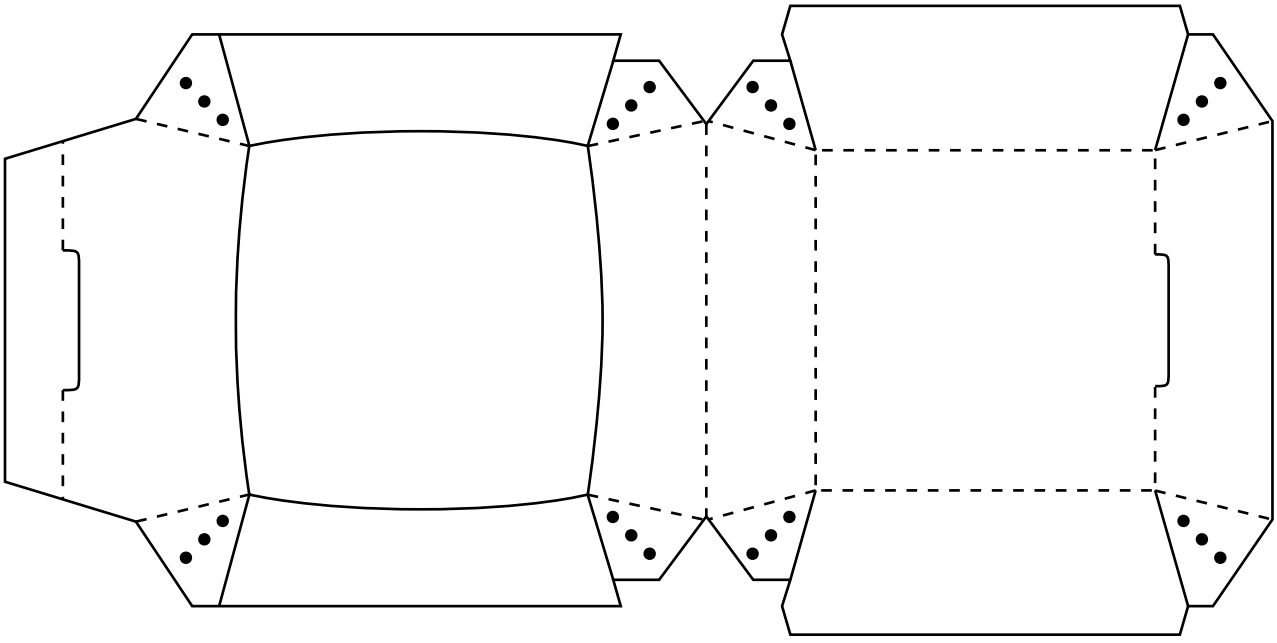


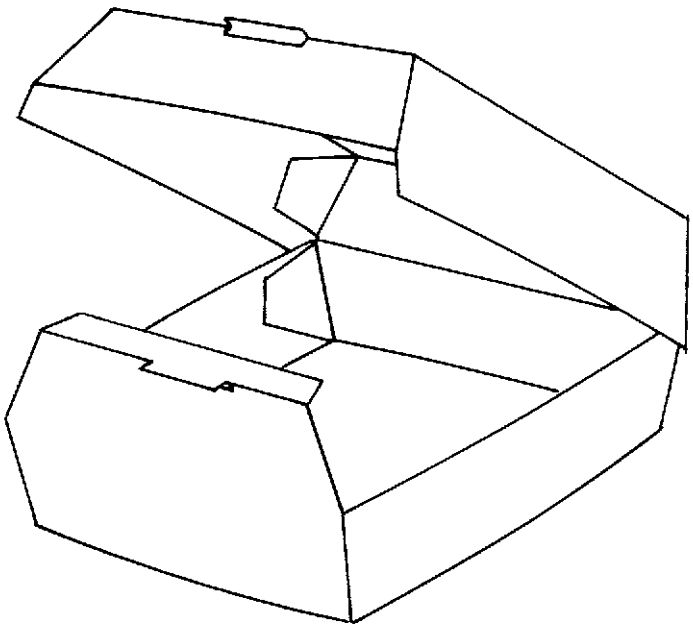


ONE-PIECE SHADOW BOX

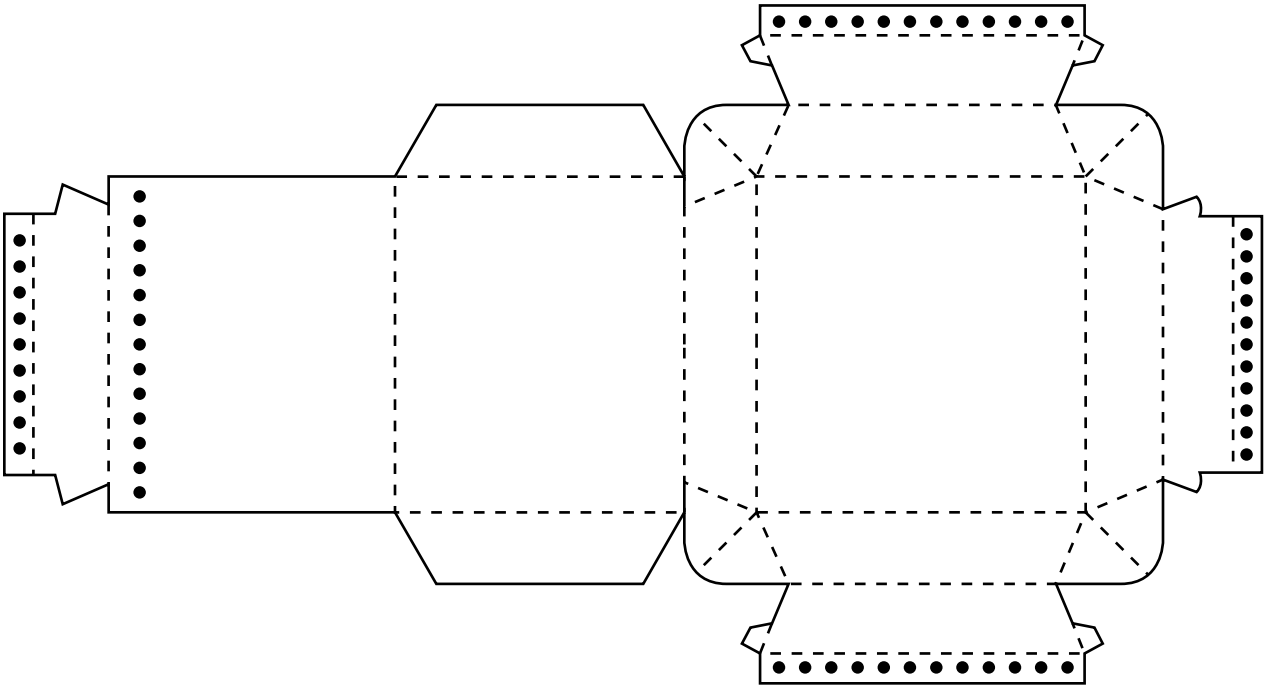


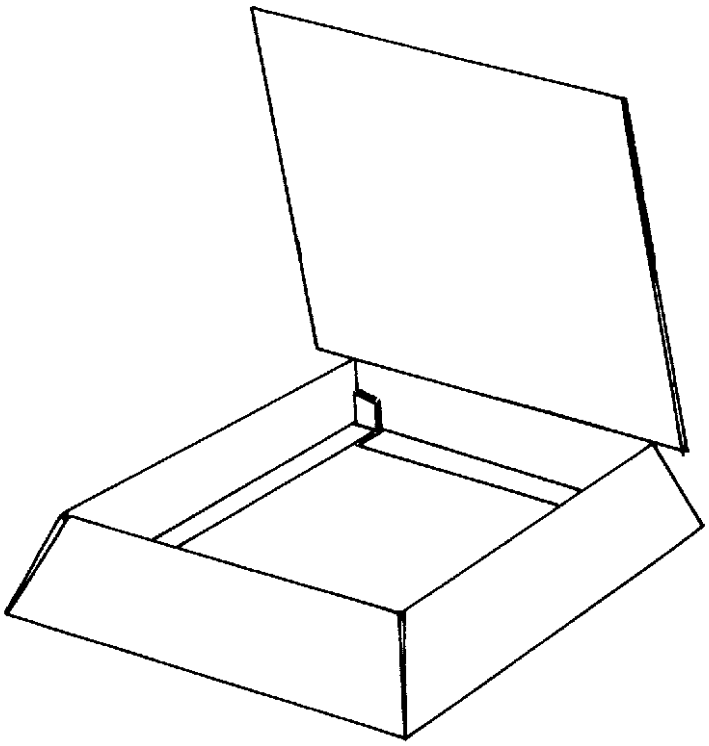




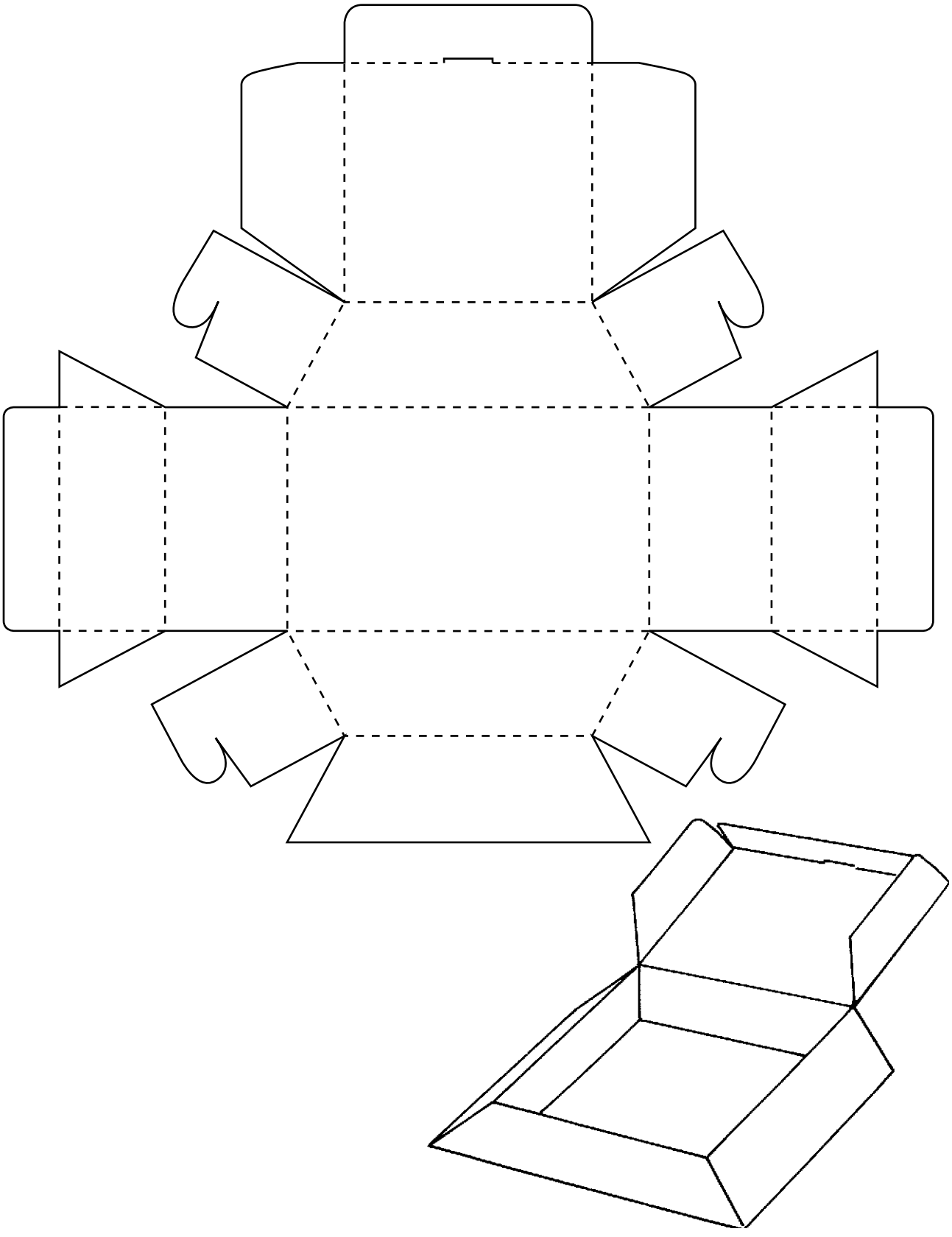


SIMPLEX STYLE VARIATION WITH TAPERED OUTSIDE END AND SIDE WALLS

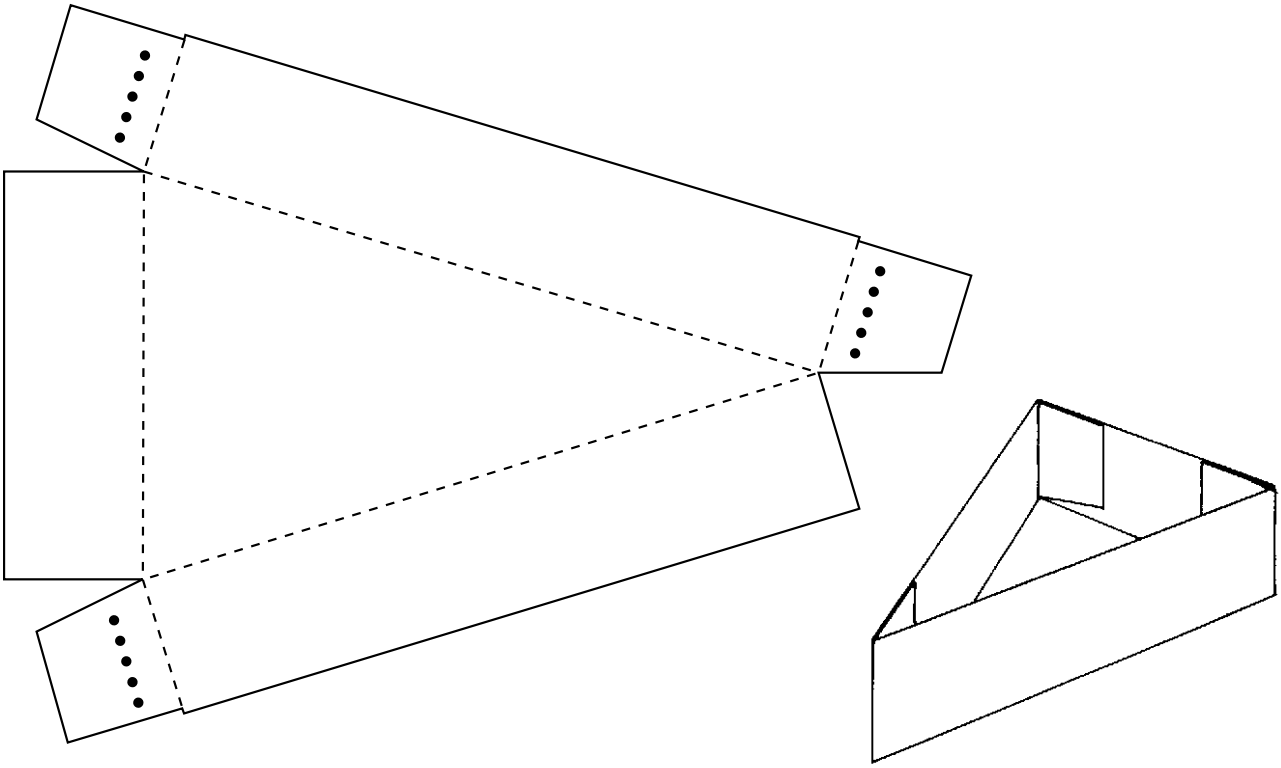




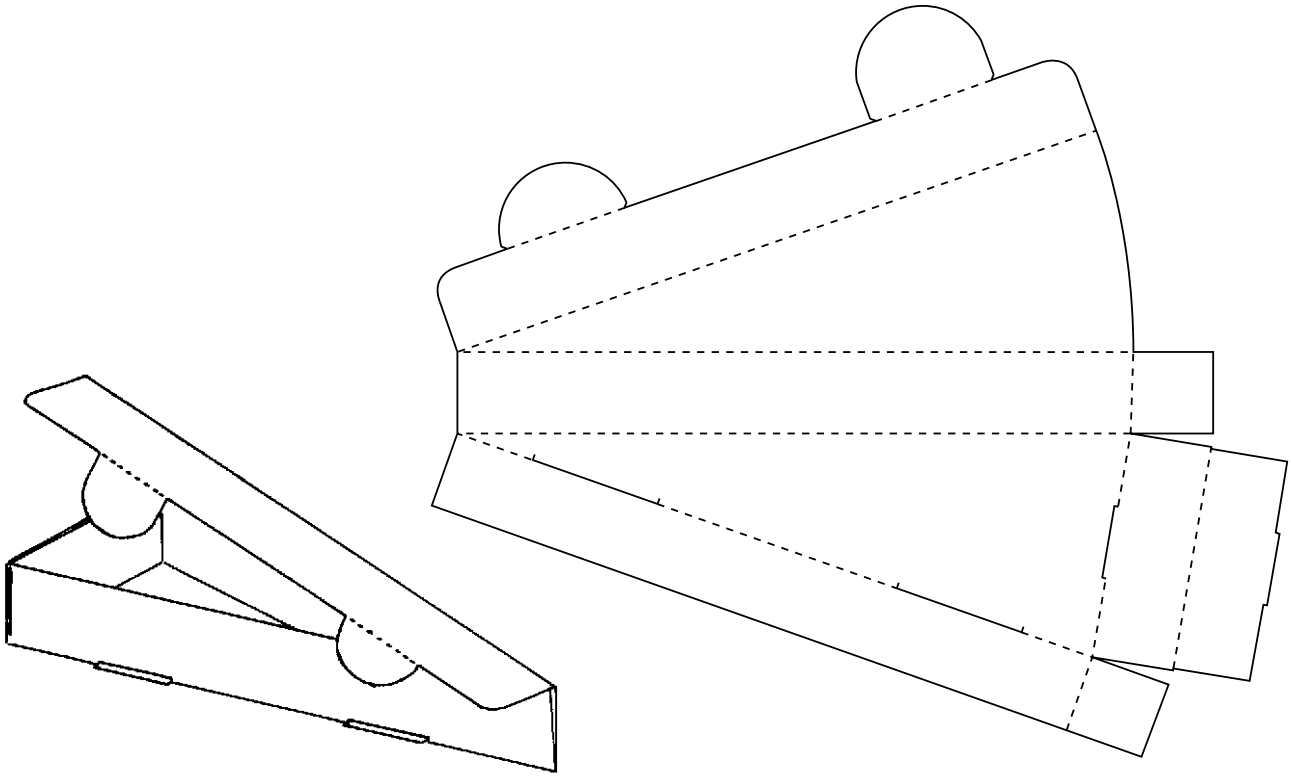
TAPERED SIDEWALL WITH ARTHUR LOCKS AND DOUBLE HOLLOW SIDE WALLS

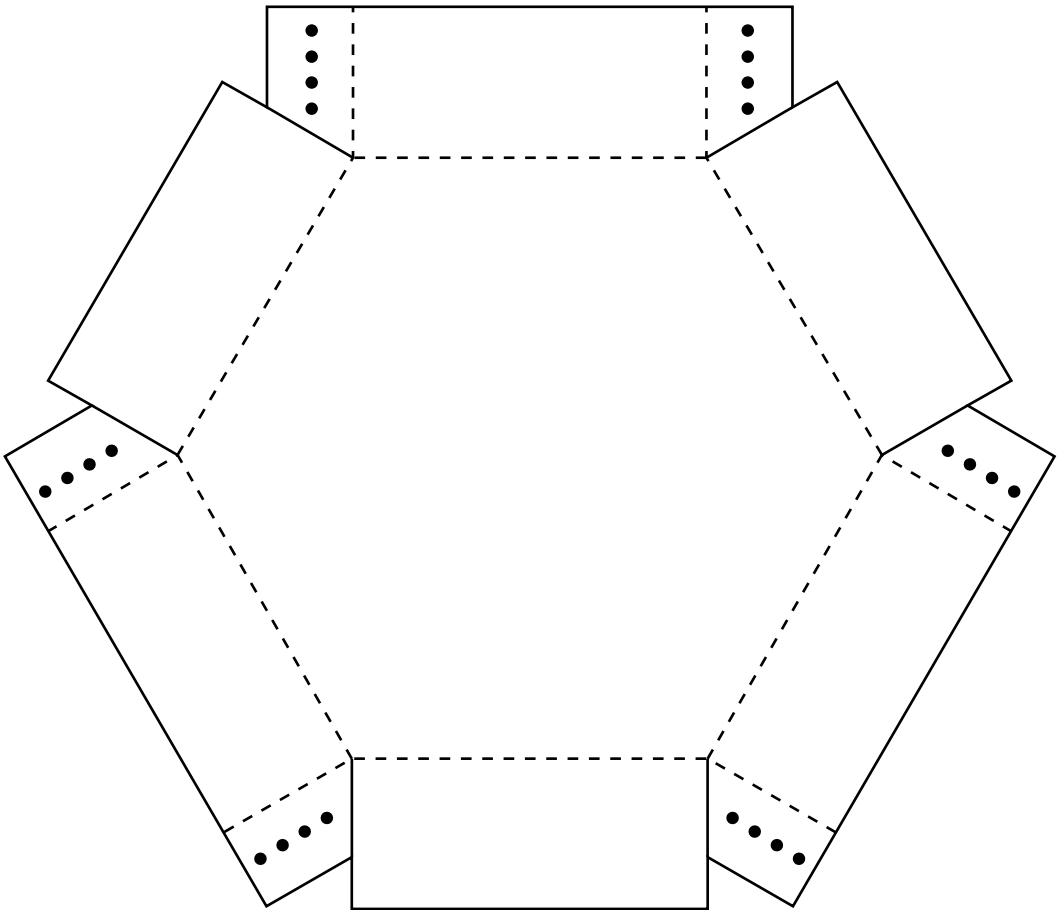


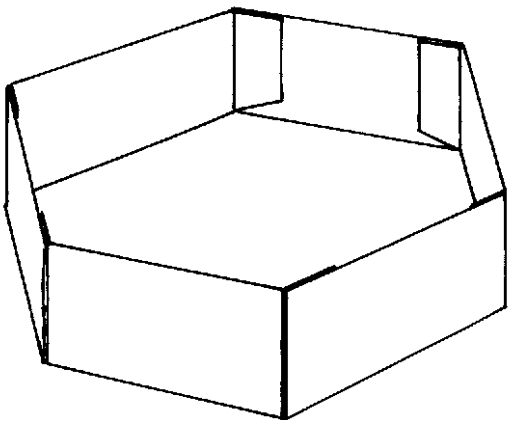
TRIANGULAR TRAY WITH GLUED CORNERS



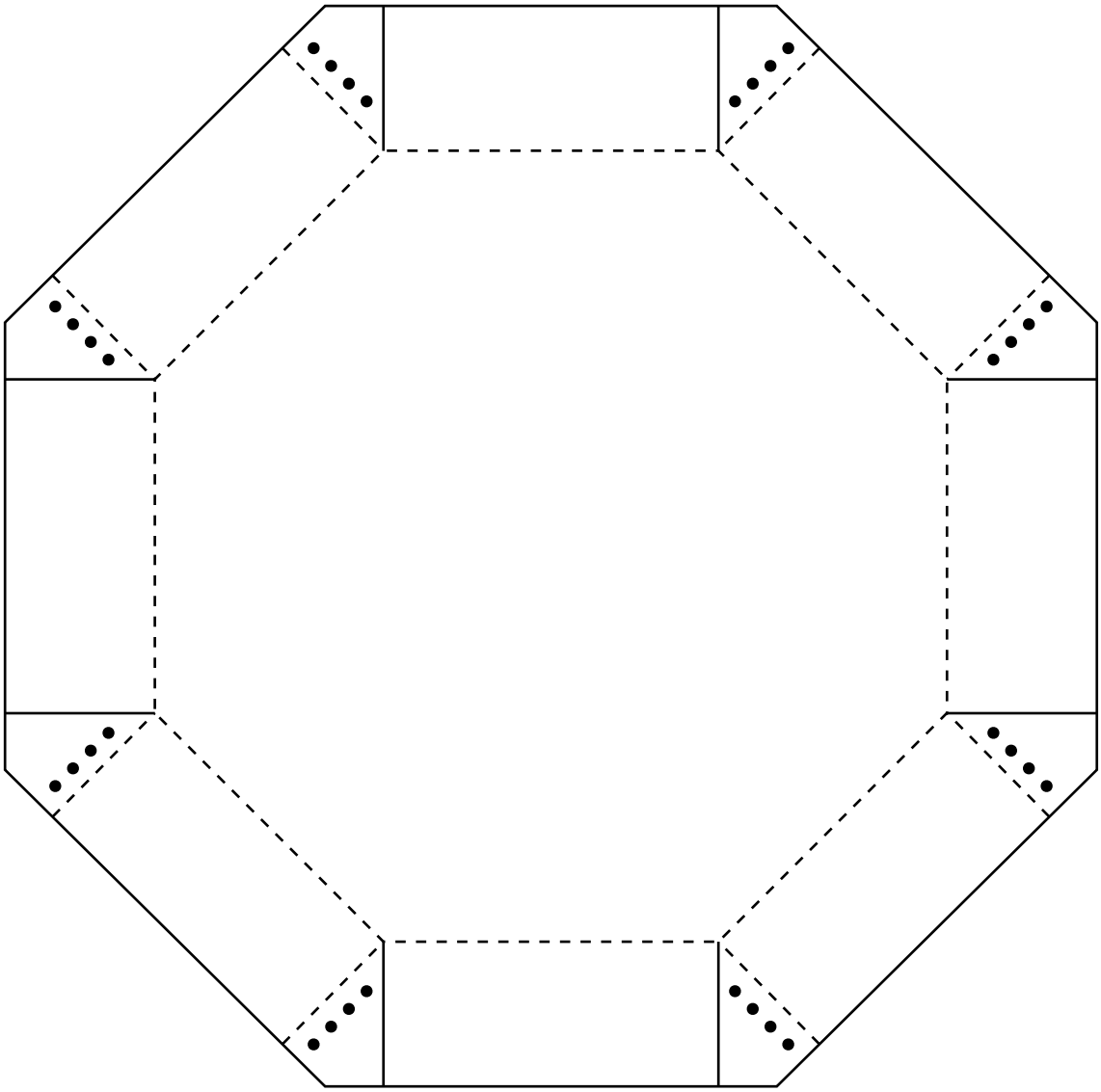
SELF-COVERED TRIANGLE WITH LOCK TABS OFF COVER

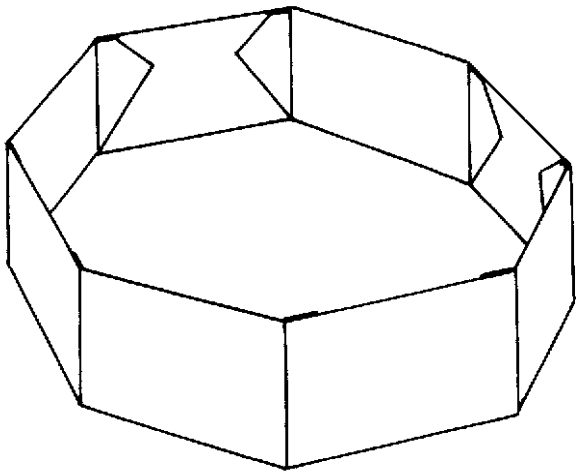


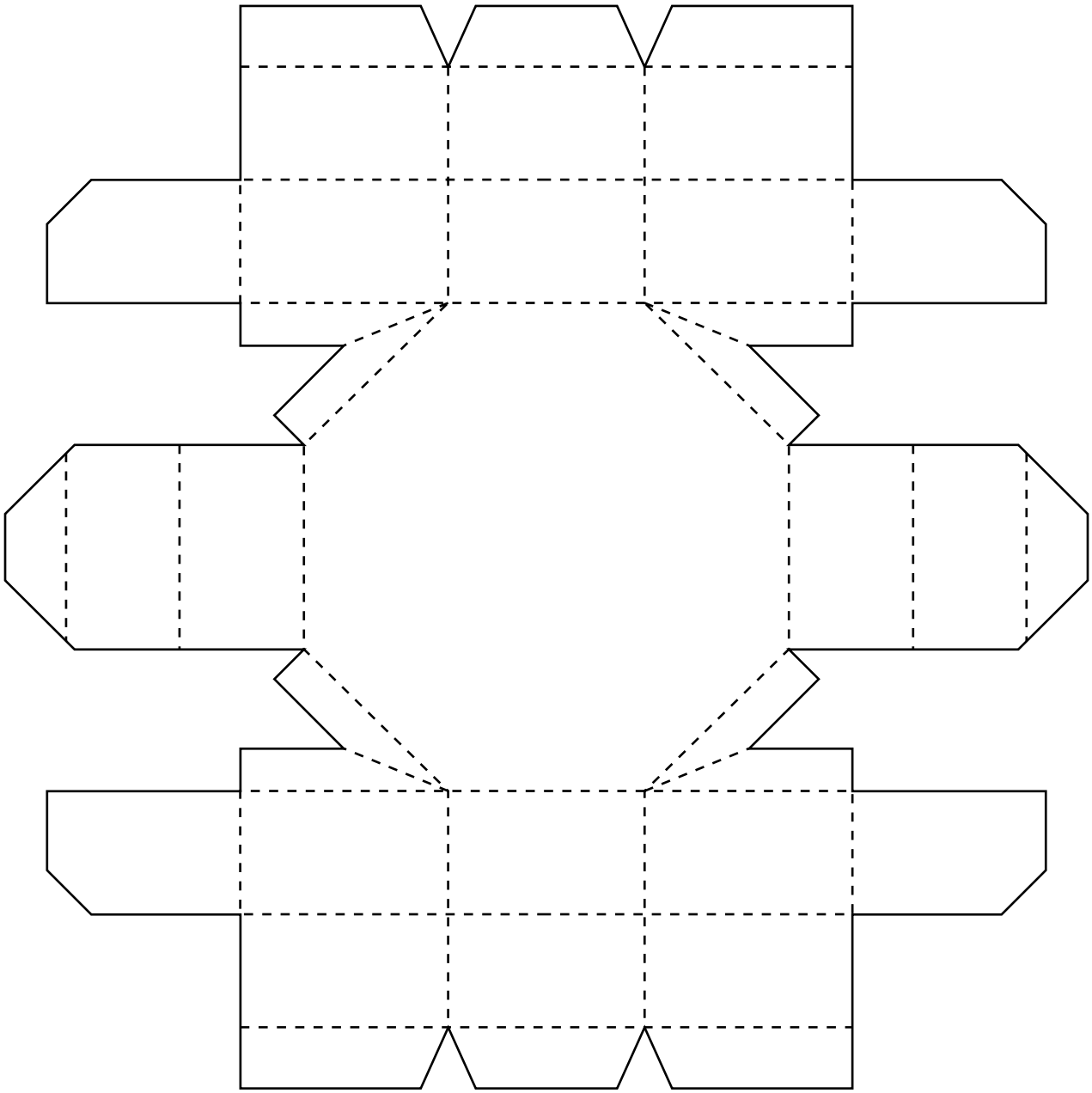


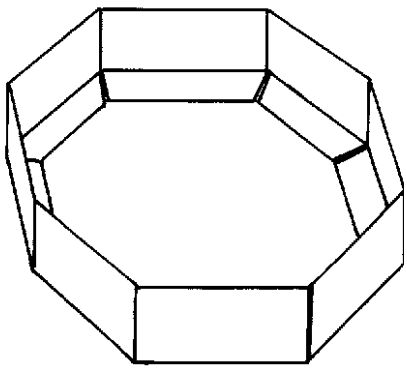


OCTAGON-STYLE TRAY

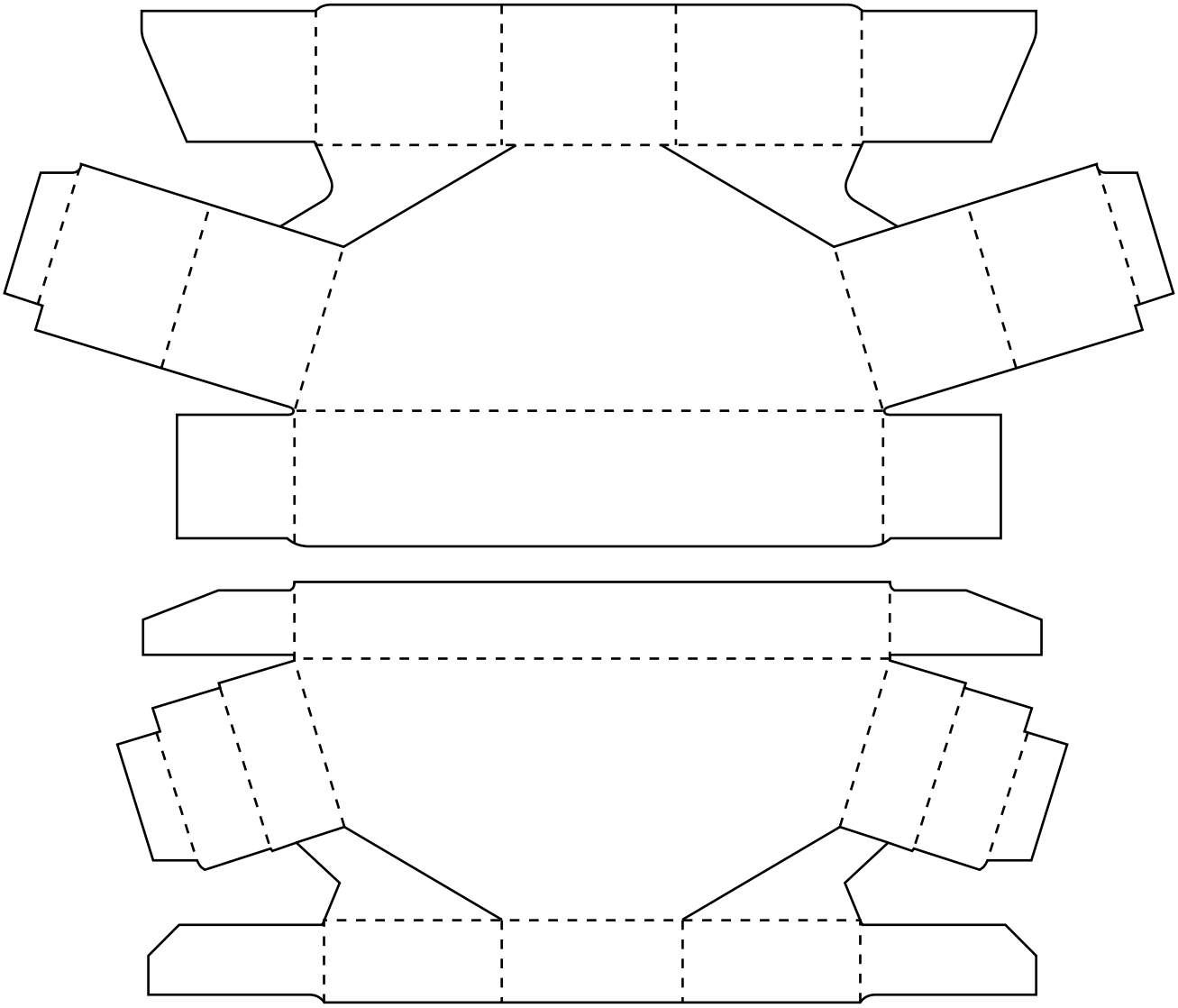


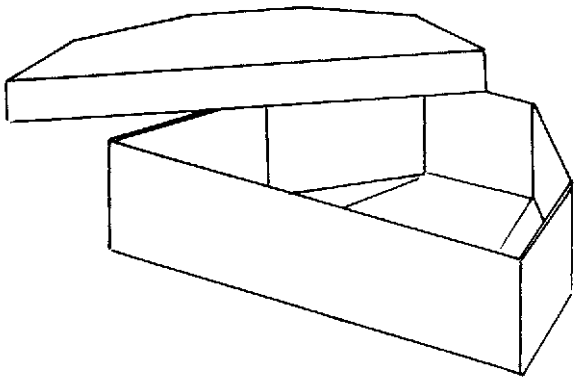


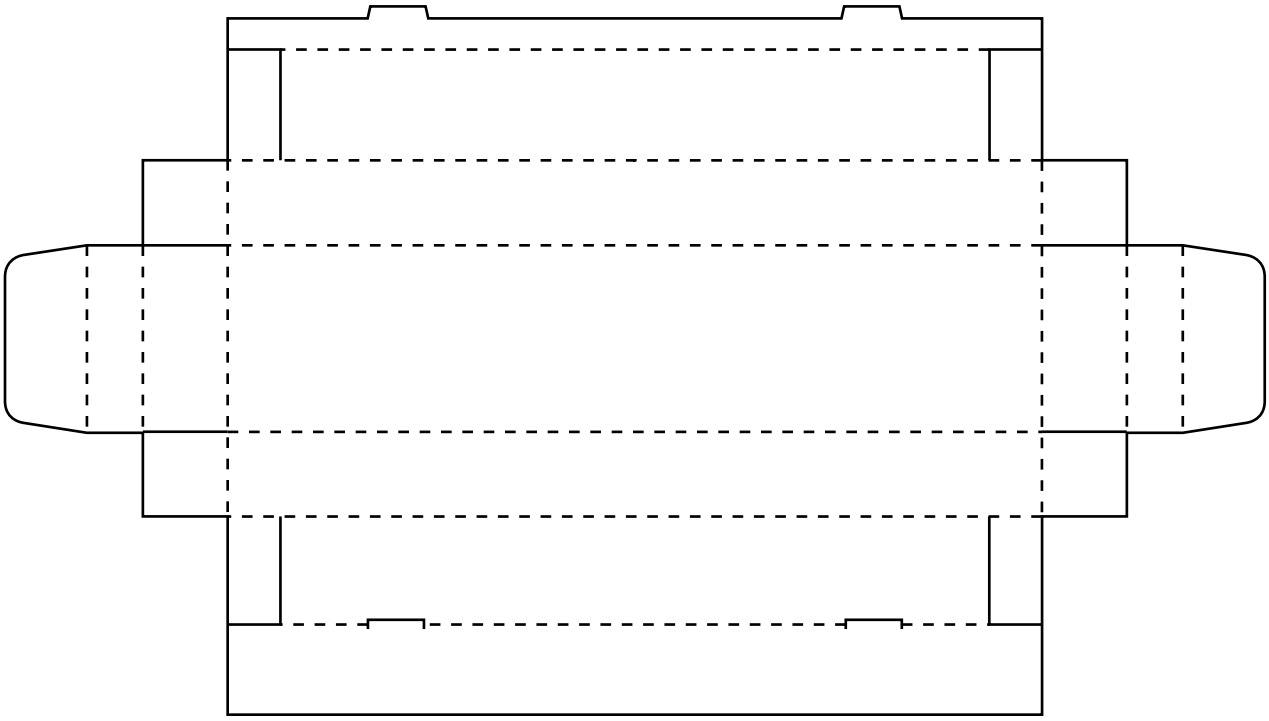




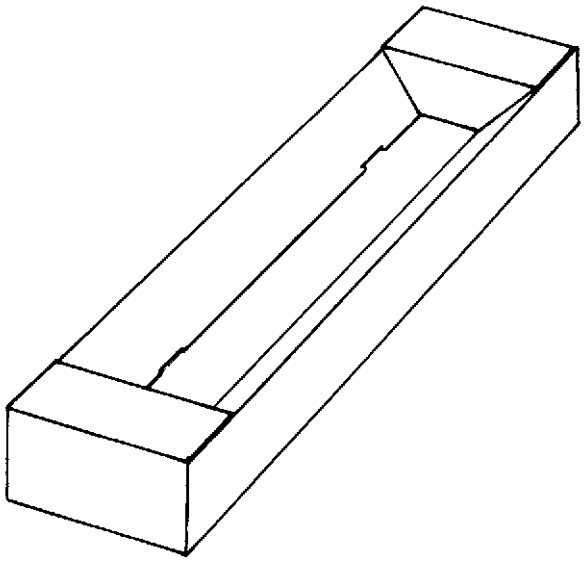
SIX-SIDED DOUBLE-WALLED TRAY AND PARTIAL TELESCOPING COVER



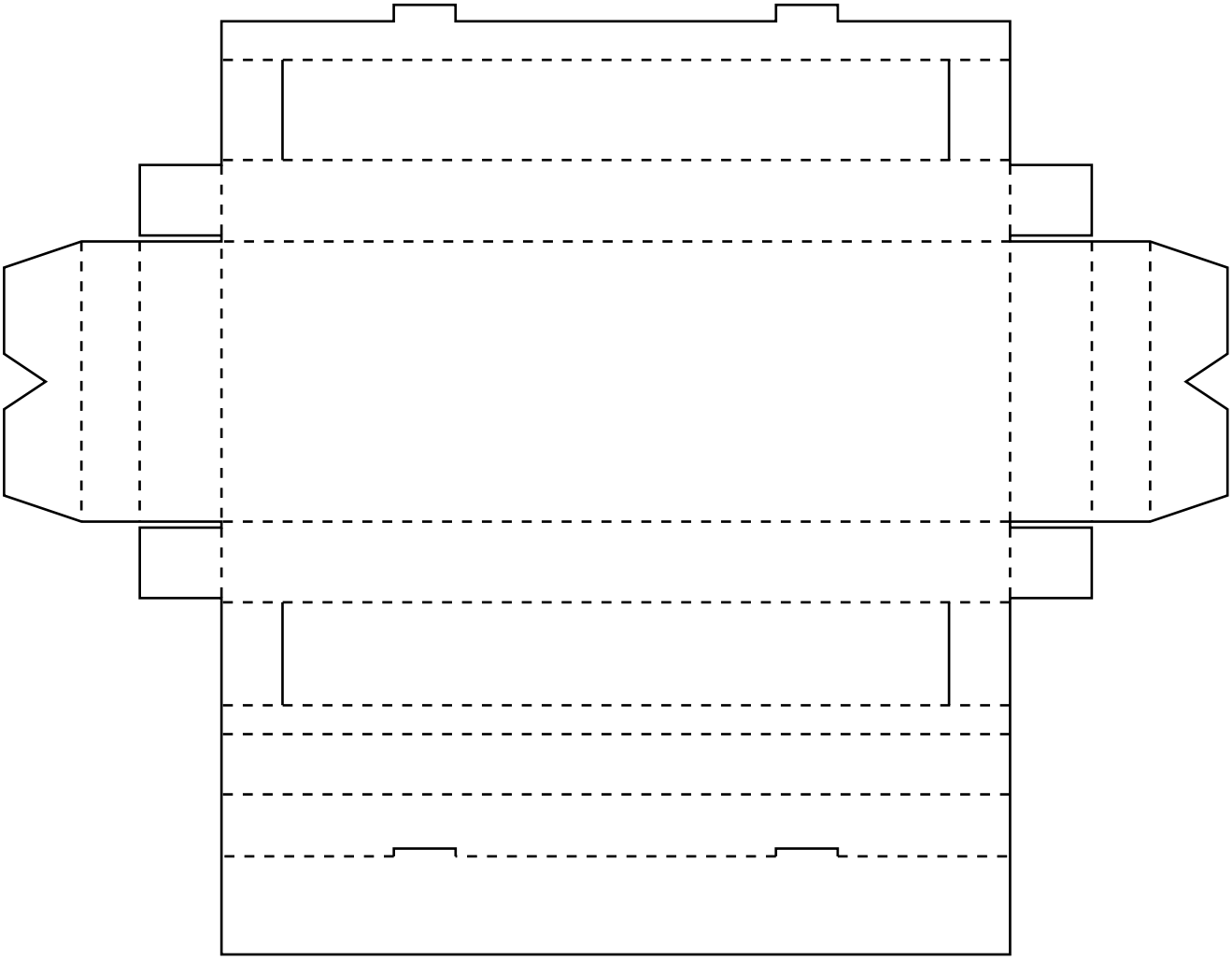


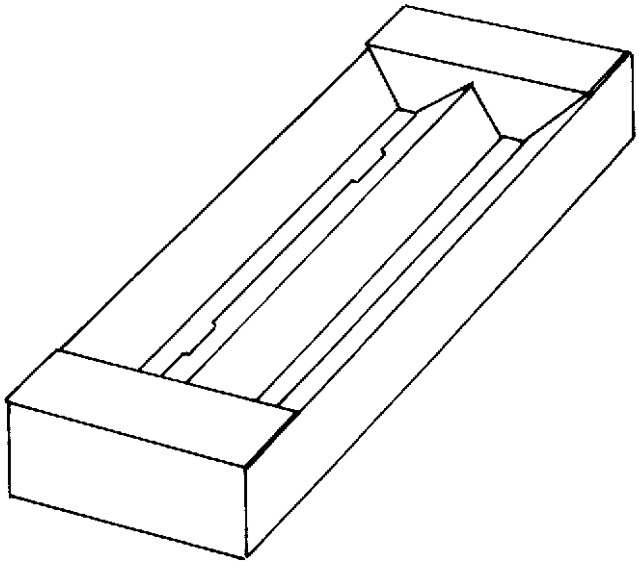


This specially constructed tray has a tapered interior that makes it an excellent container for pens and similar items.

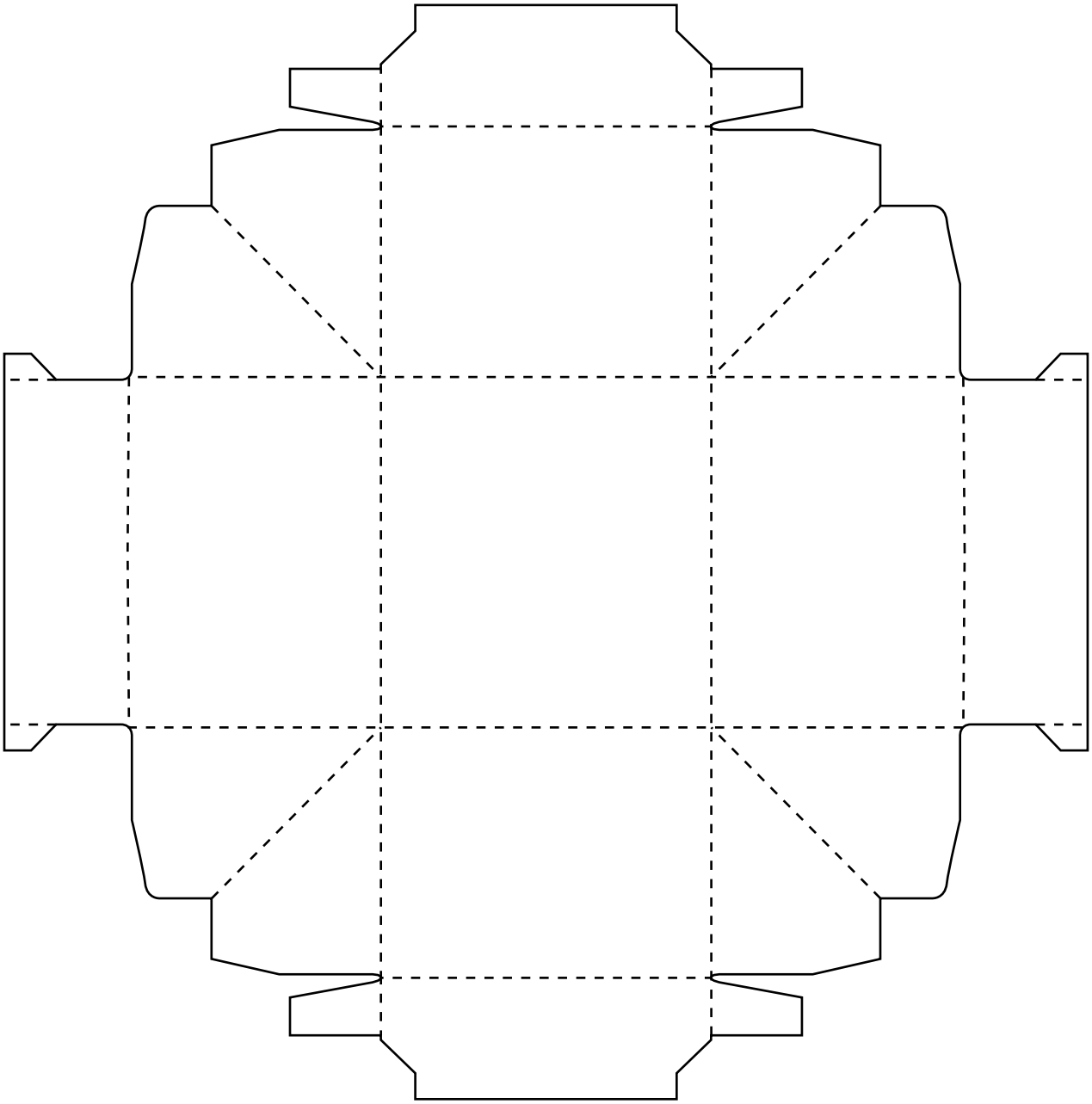


PEN AND PENCIL TRAY

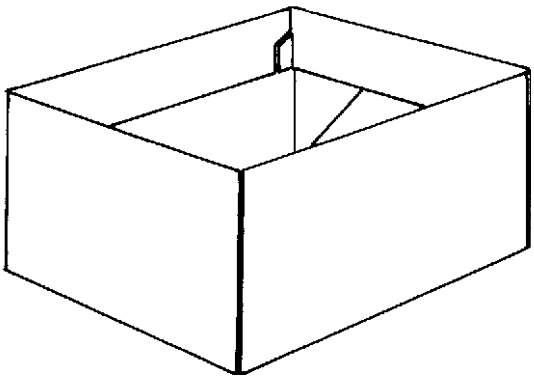




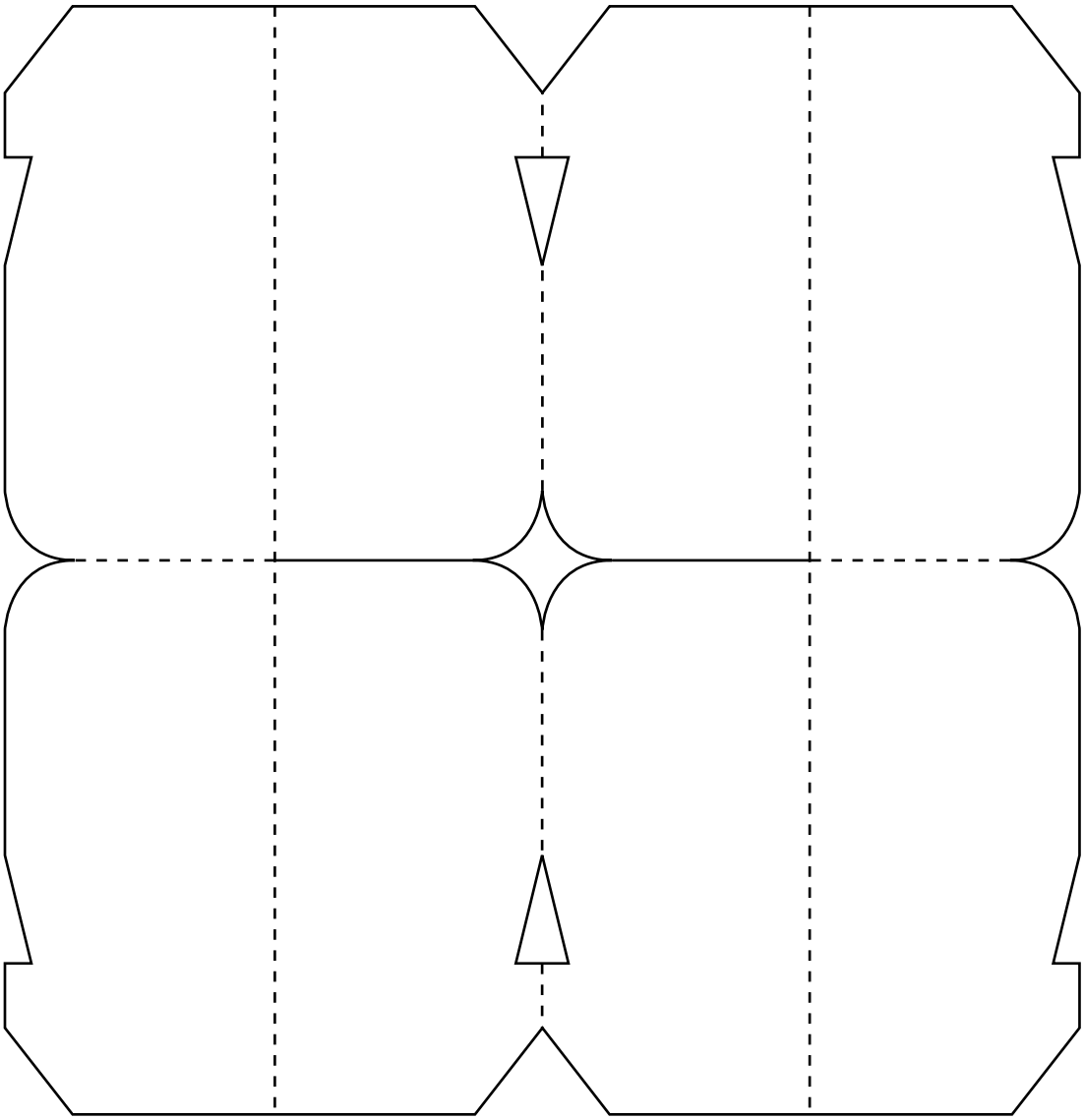
This variation of the preceding pattern is adaptable for multiunit packaging.

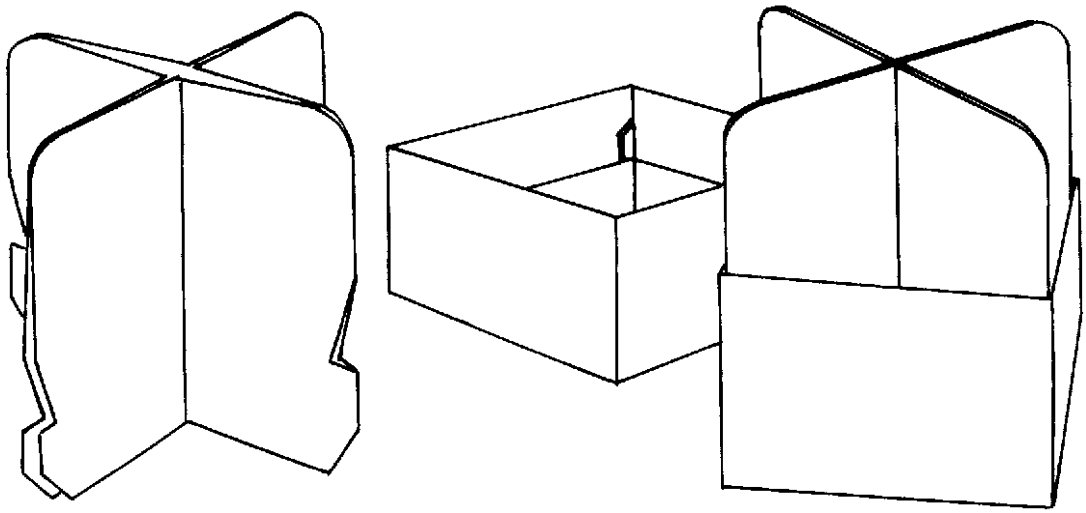


Two Simplex-style trays with the partition on the following page make an interesting design for a four-compartment tray.



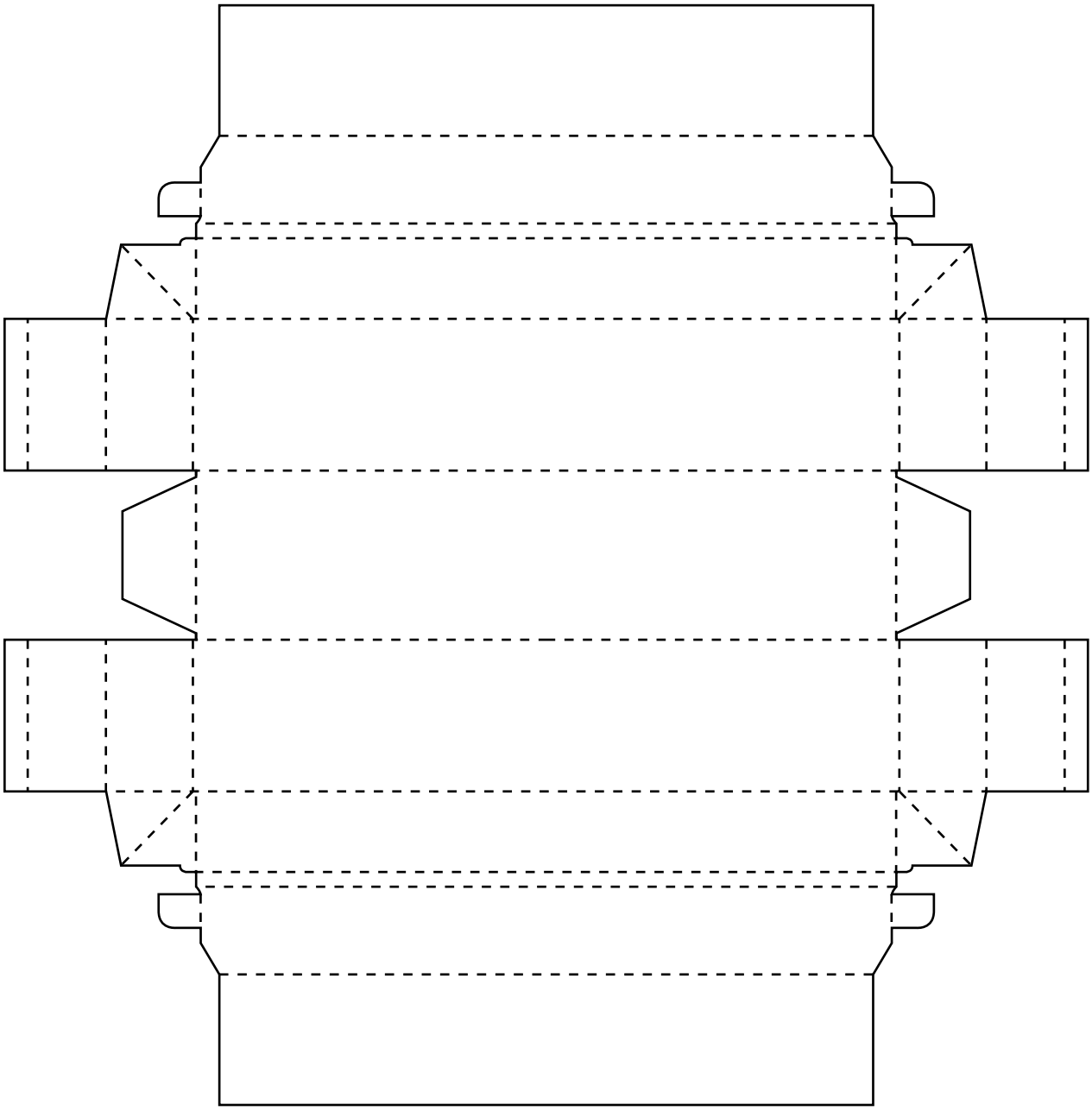
TRAY PARTITION





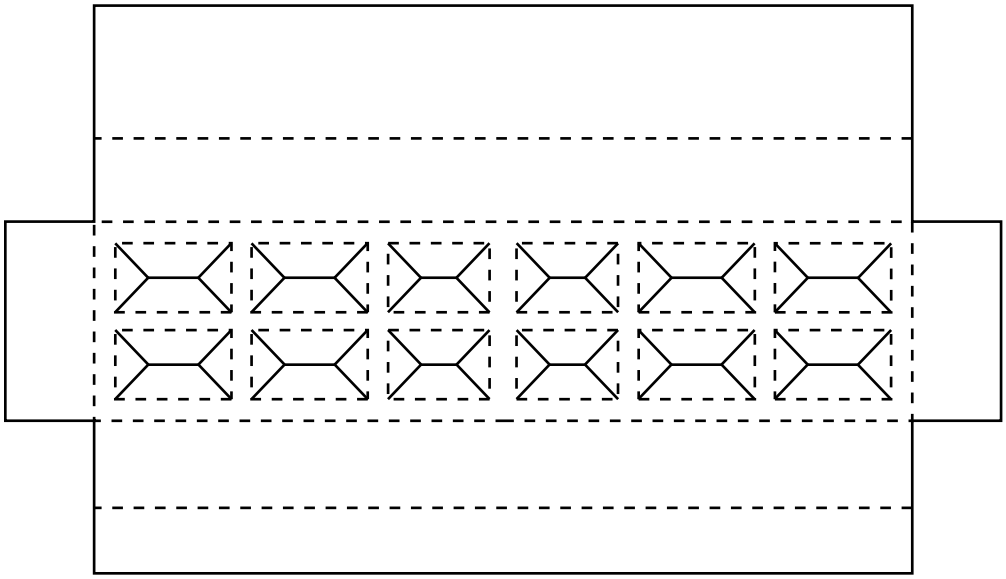
The notches in the lower part of the partition will lock into the partial double side walls of the tray.

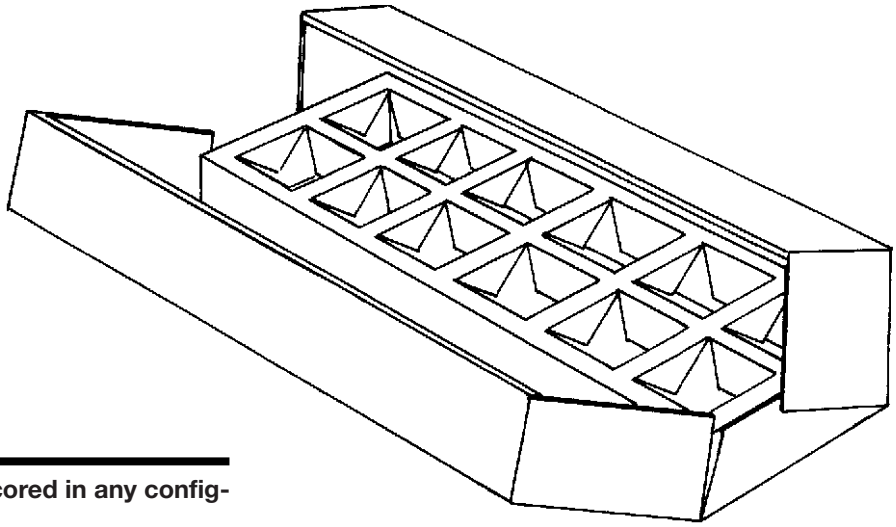
CLOSABLE SIMPLEX-STYLE TRAY



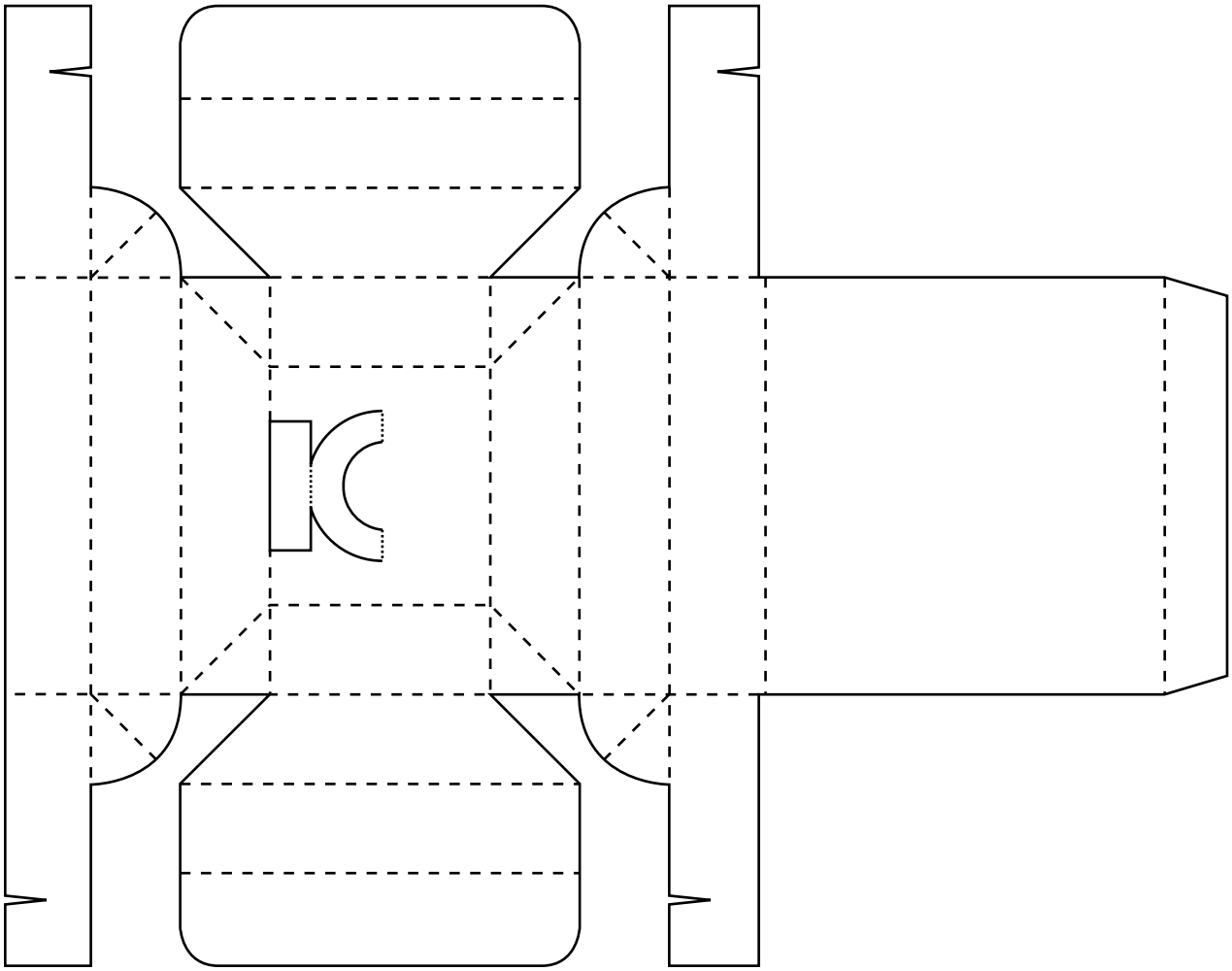
This variation of the Simplex-style tray has two double walled cover sections that meet in the top center. The insert illustrated on the following page indicates the many possibilities inherent in these patterns. This package was sealed with a self-adhesive gold-foil sticker.

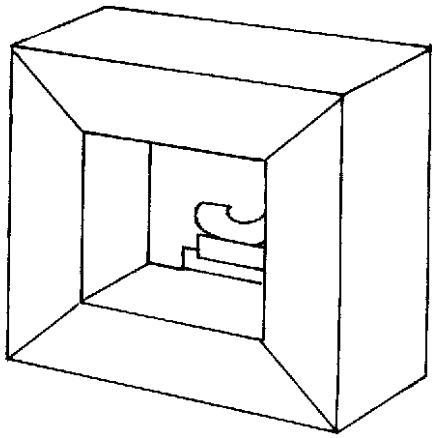
TWELVE-COUNT TRAY INSERT





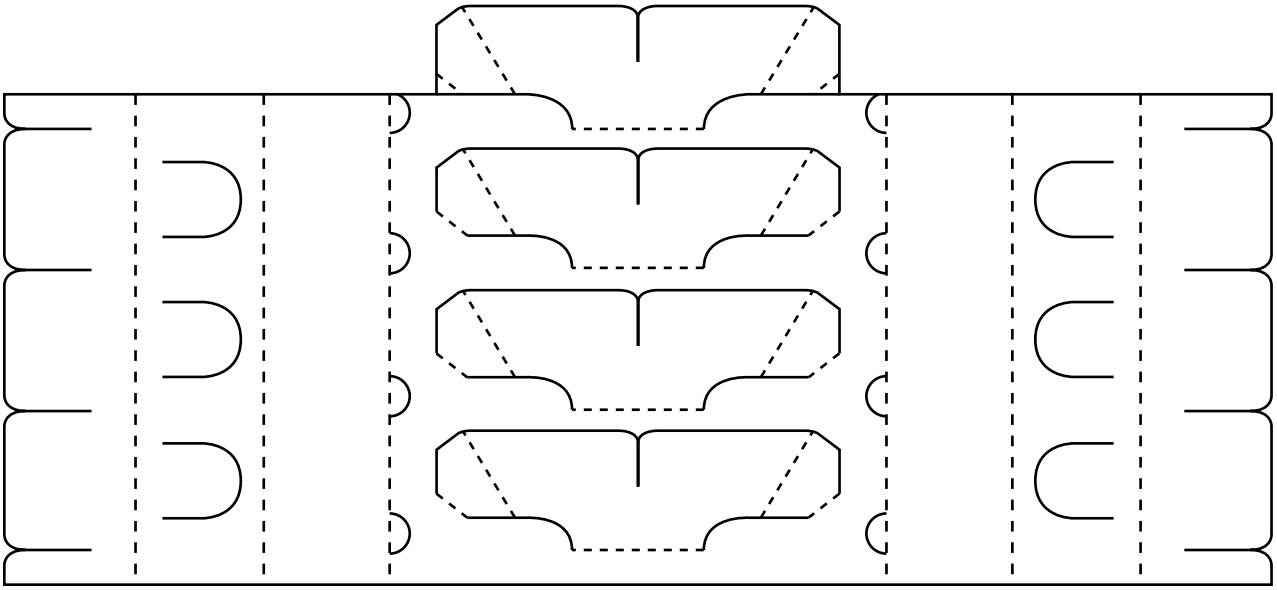
The insert may be die-cut and scored in any configuration desired.



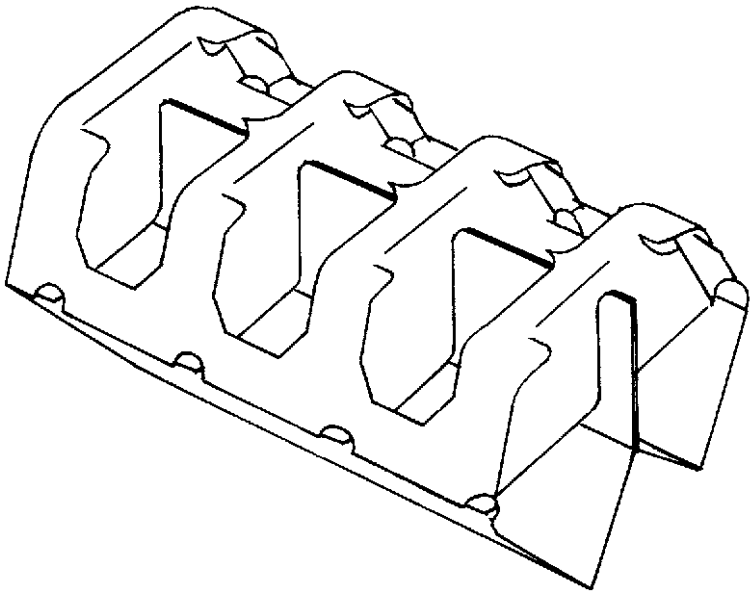


A more complex example of a frame view tray.

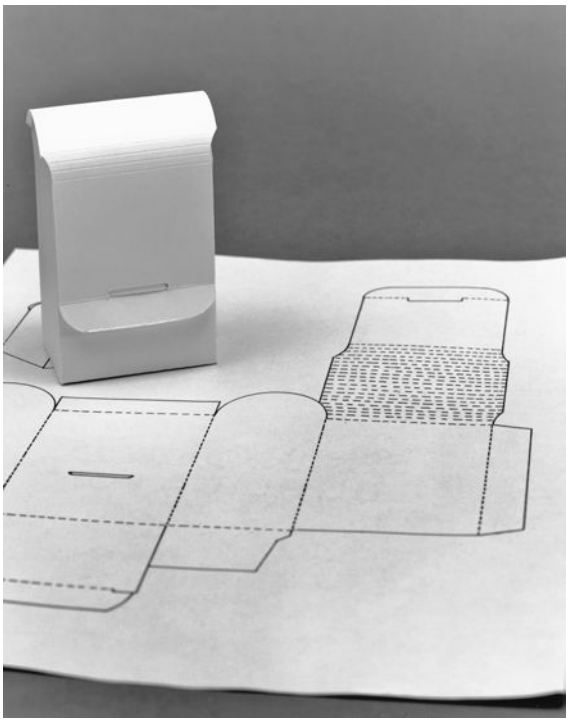
SIX-COUNT EGG OR FRUIT TRAY



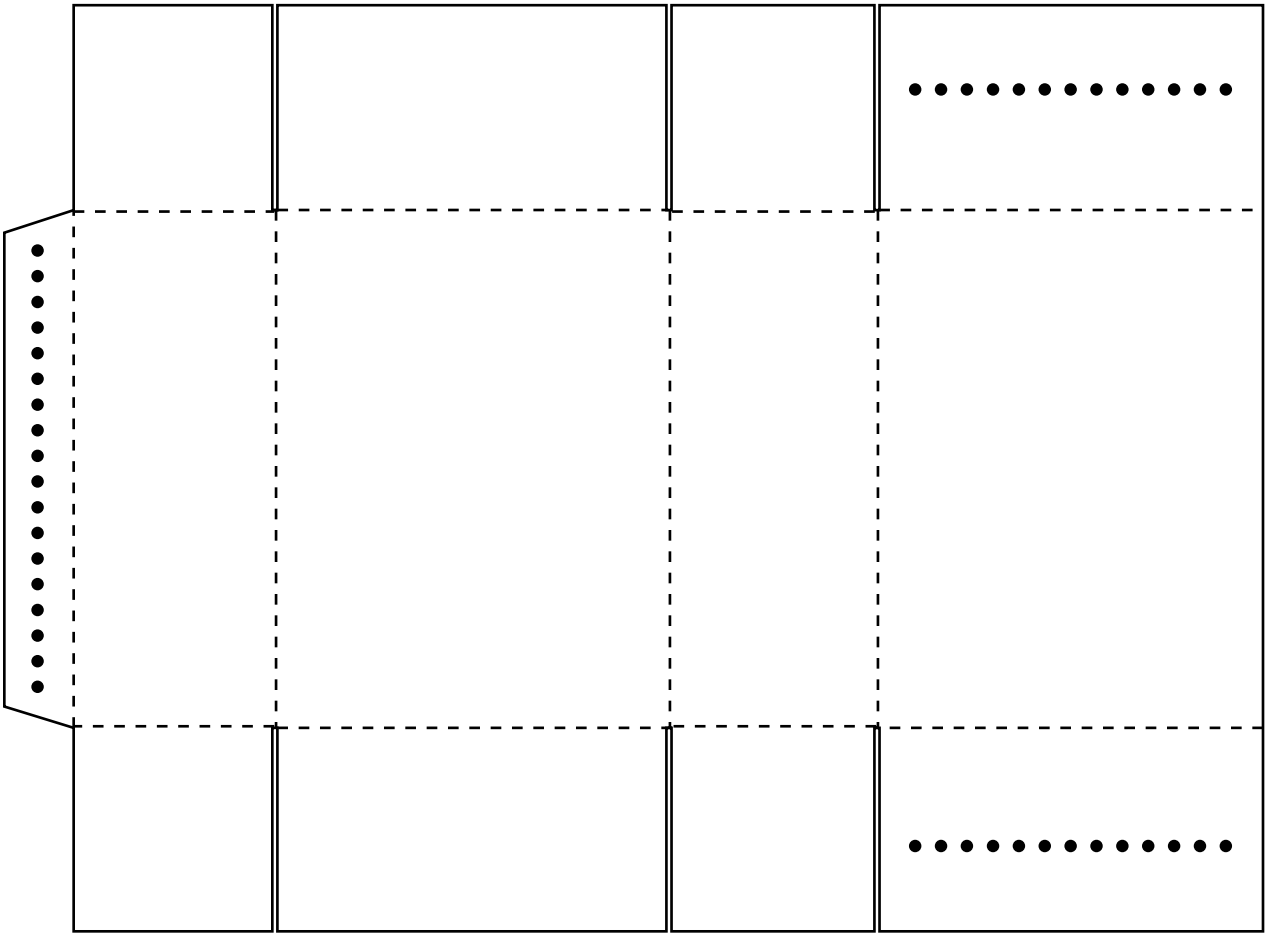
This one-piece scored and die-cut tray may be used for eggs, fruit, candy, and the like.

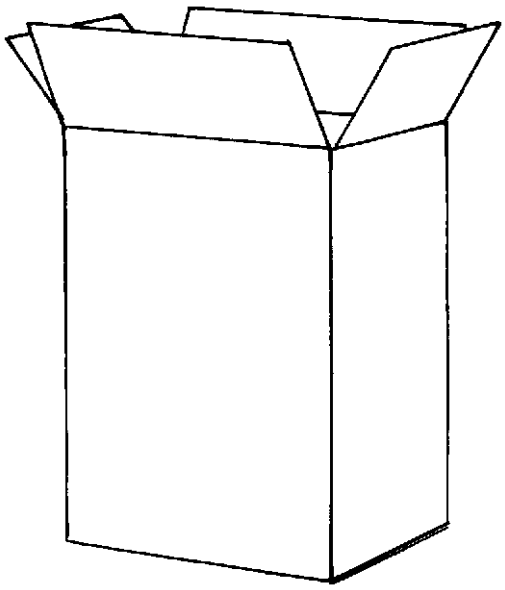


Tubes

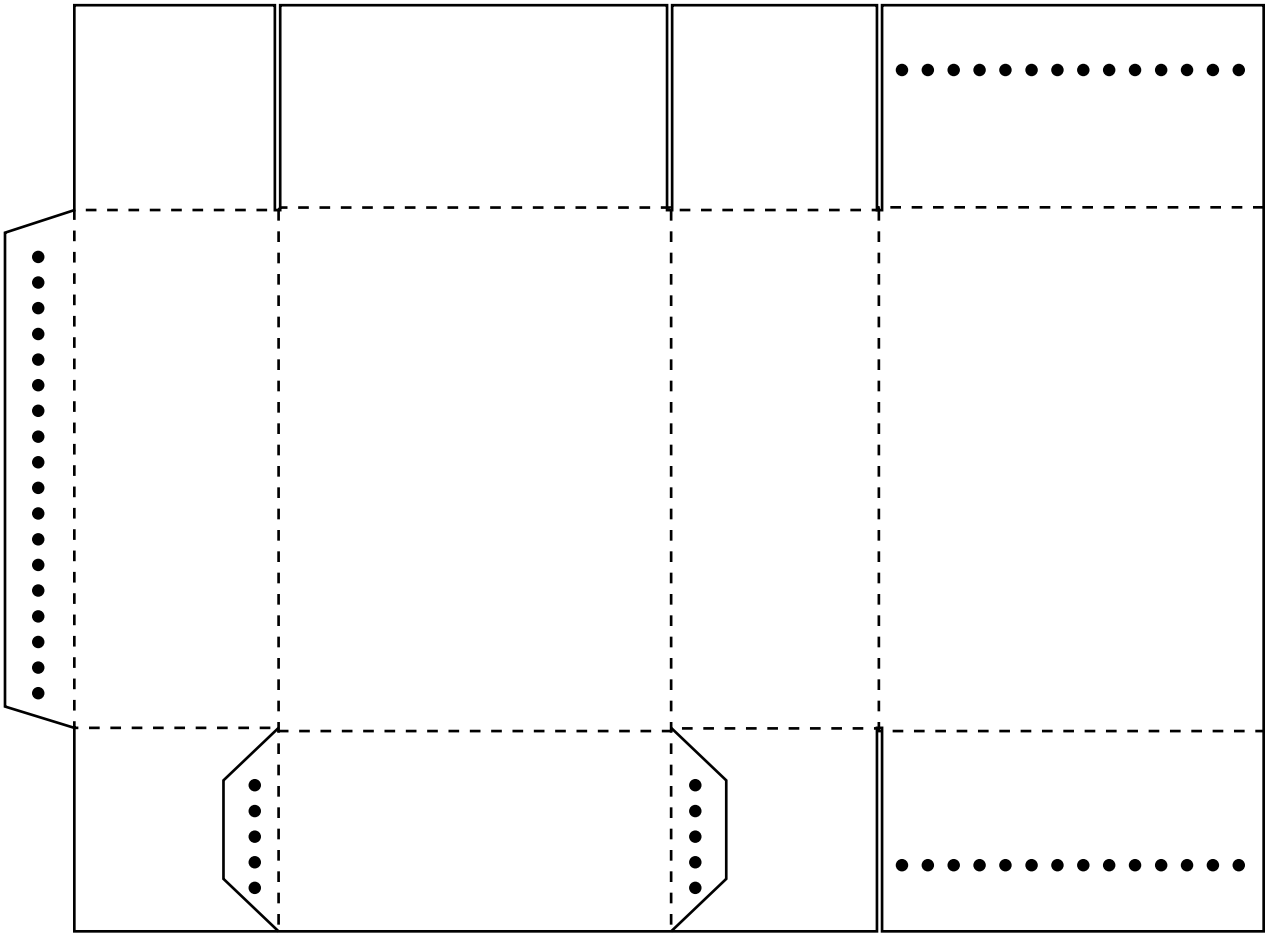


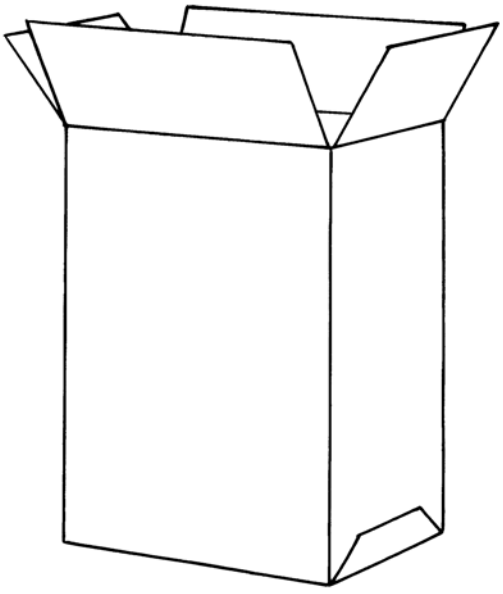
FULL OVERLAP SEAL END



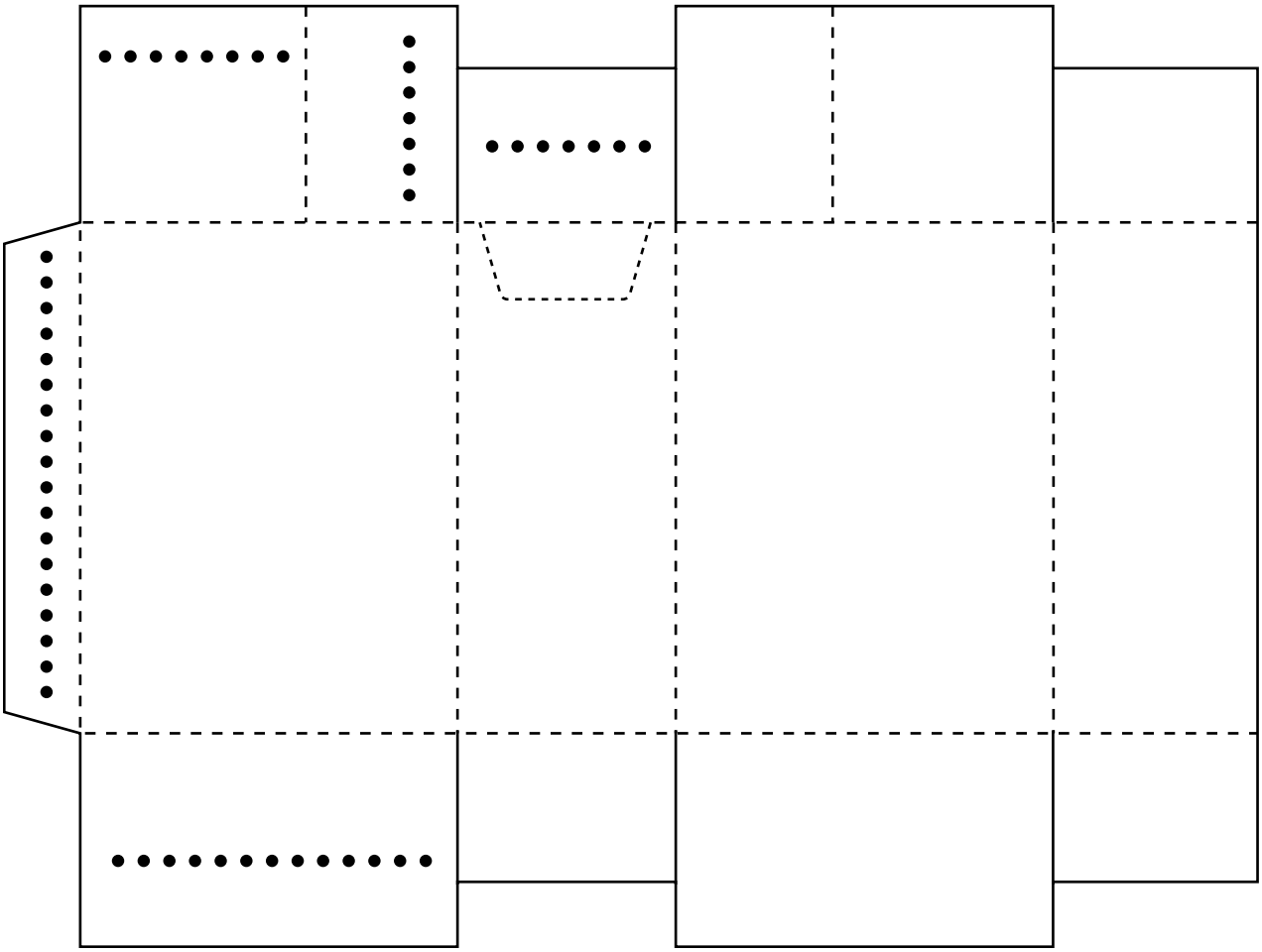


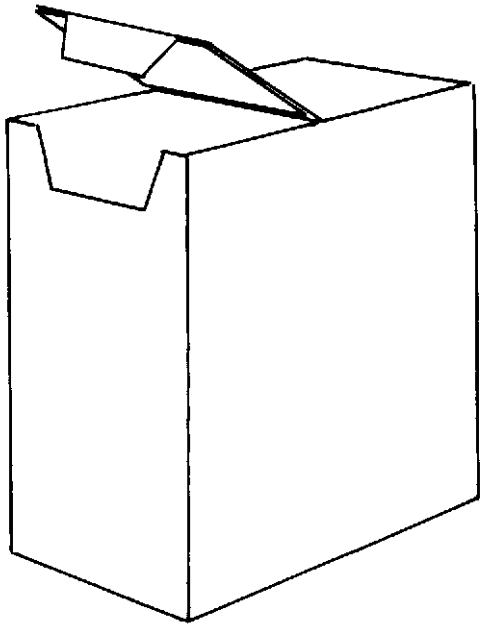
FULL OVERLAP SEAL END WITH VAN BUREN EARS AT BOTTOM



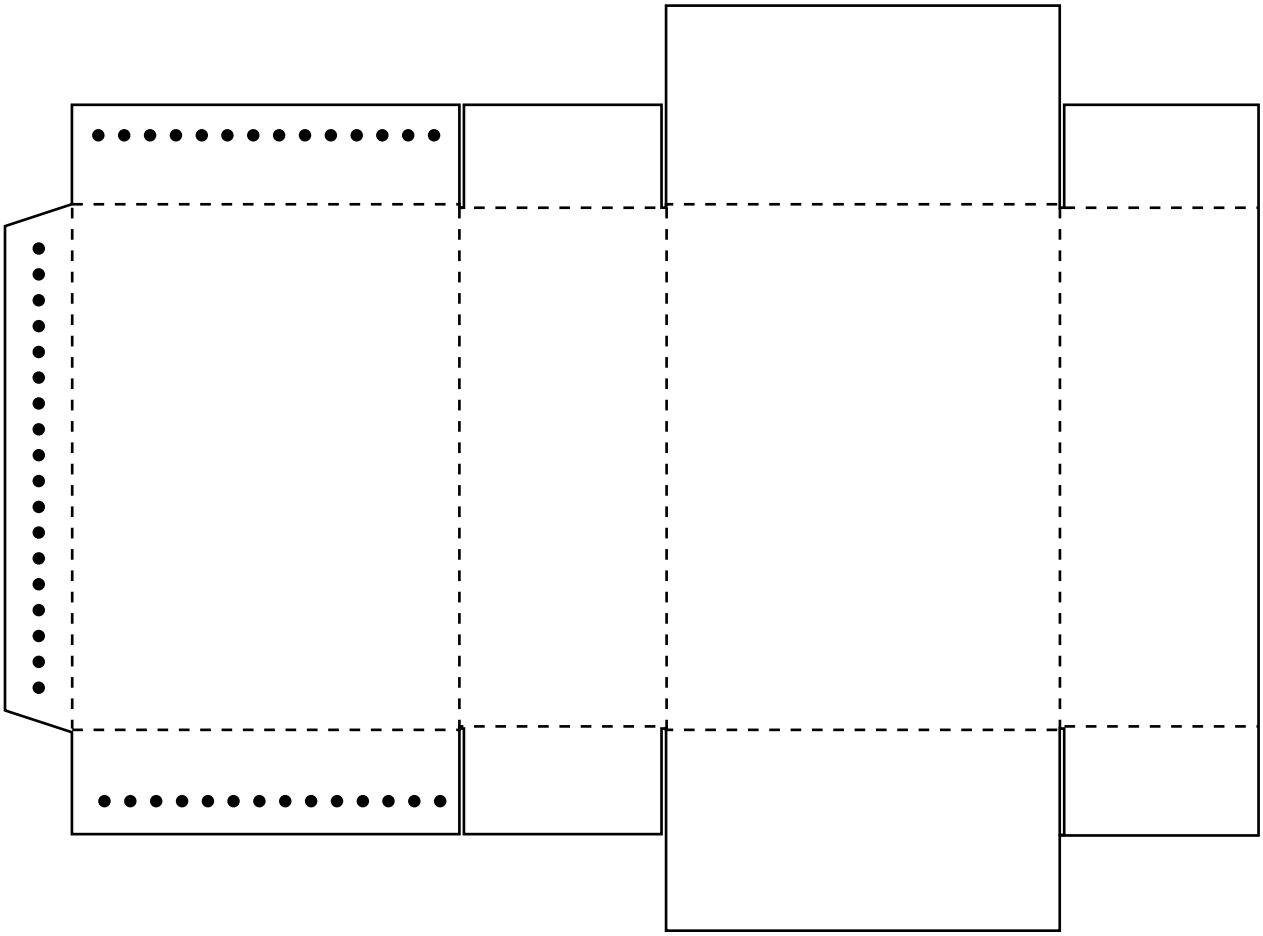


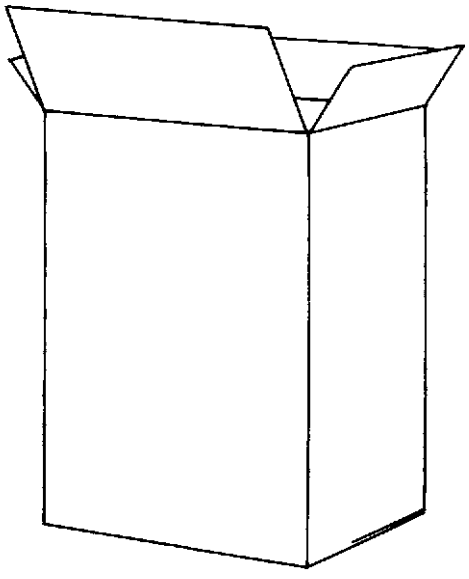
FULL OVERLAP SEAL END WITH PRE-PERFORATED POUR SPOUT



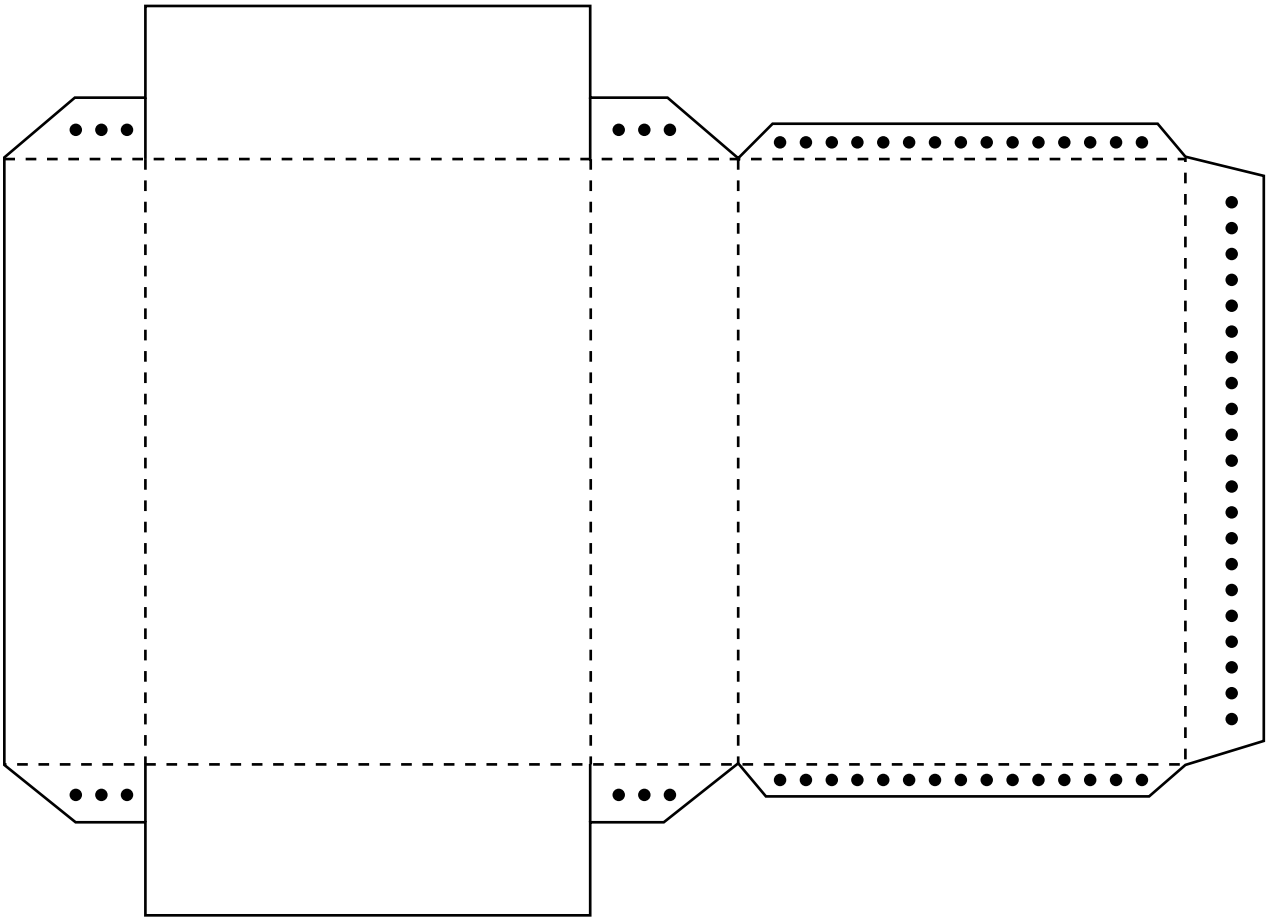


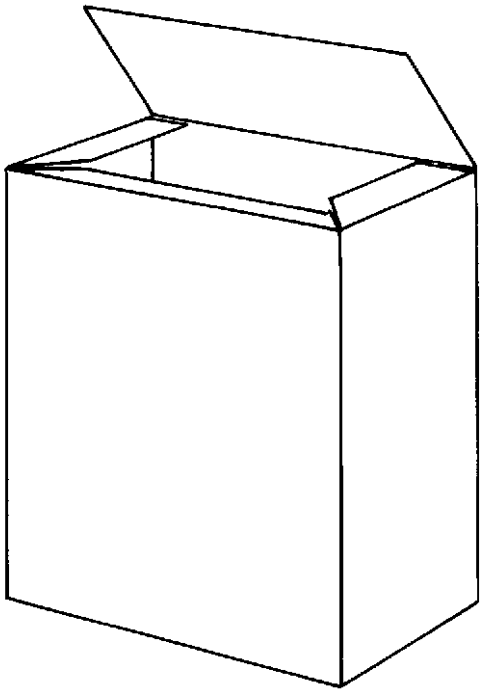
ECONOMY SEAL END

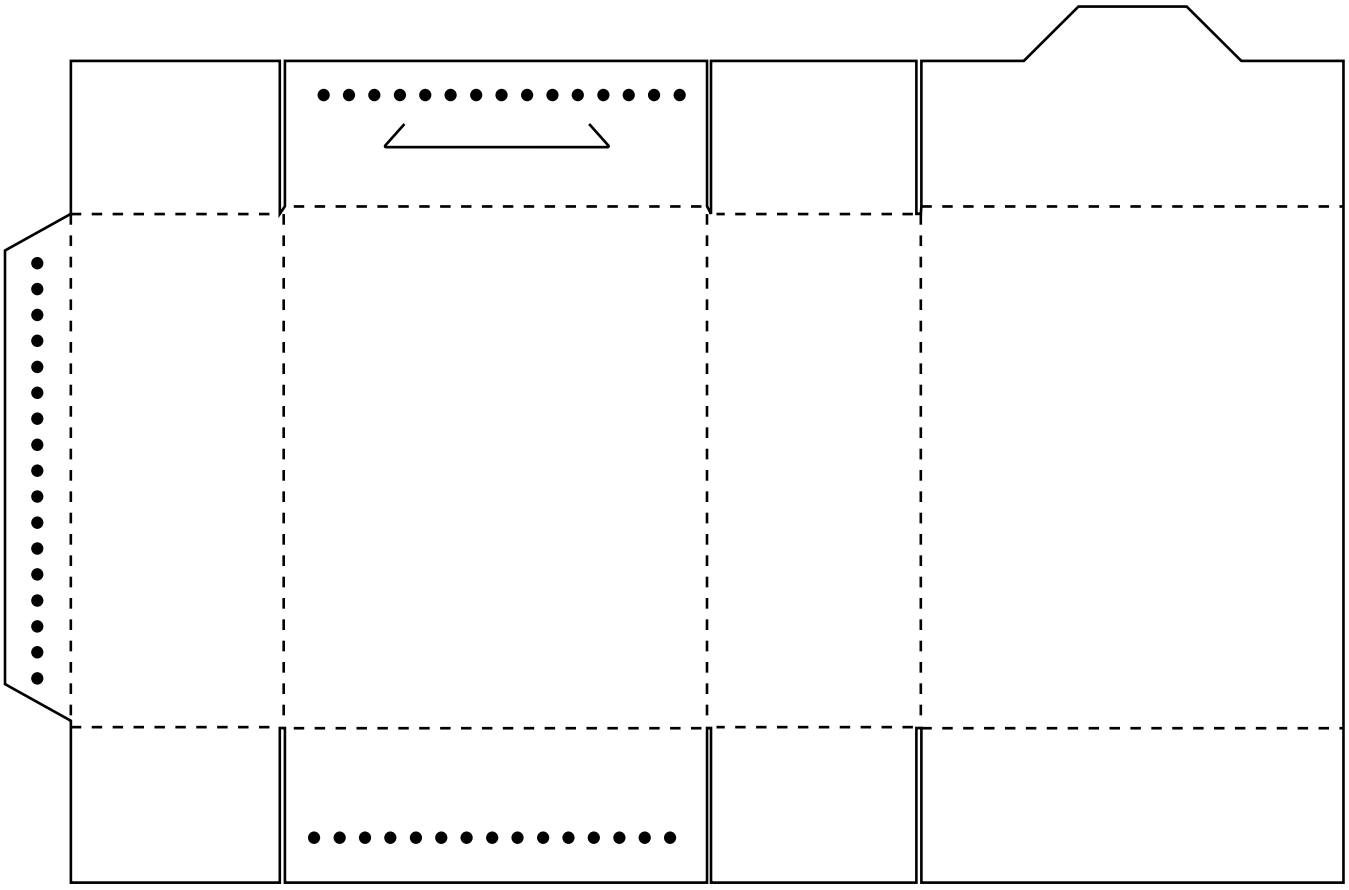


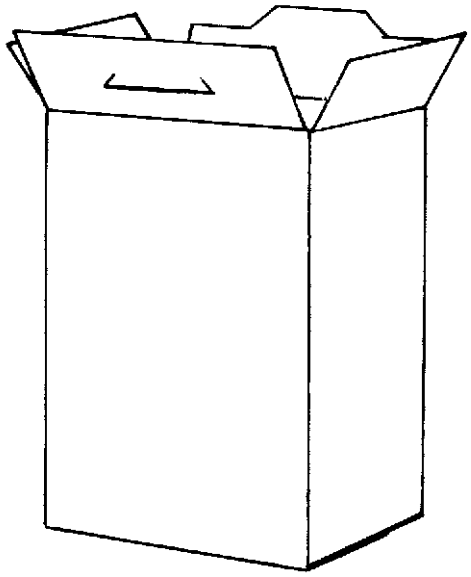


ECONOMY SEAL END (VARIATION)

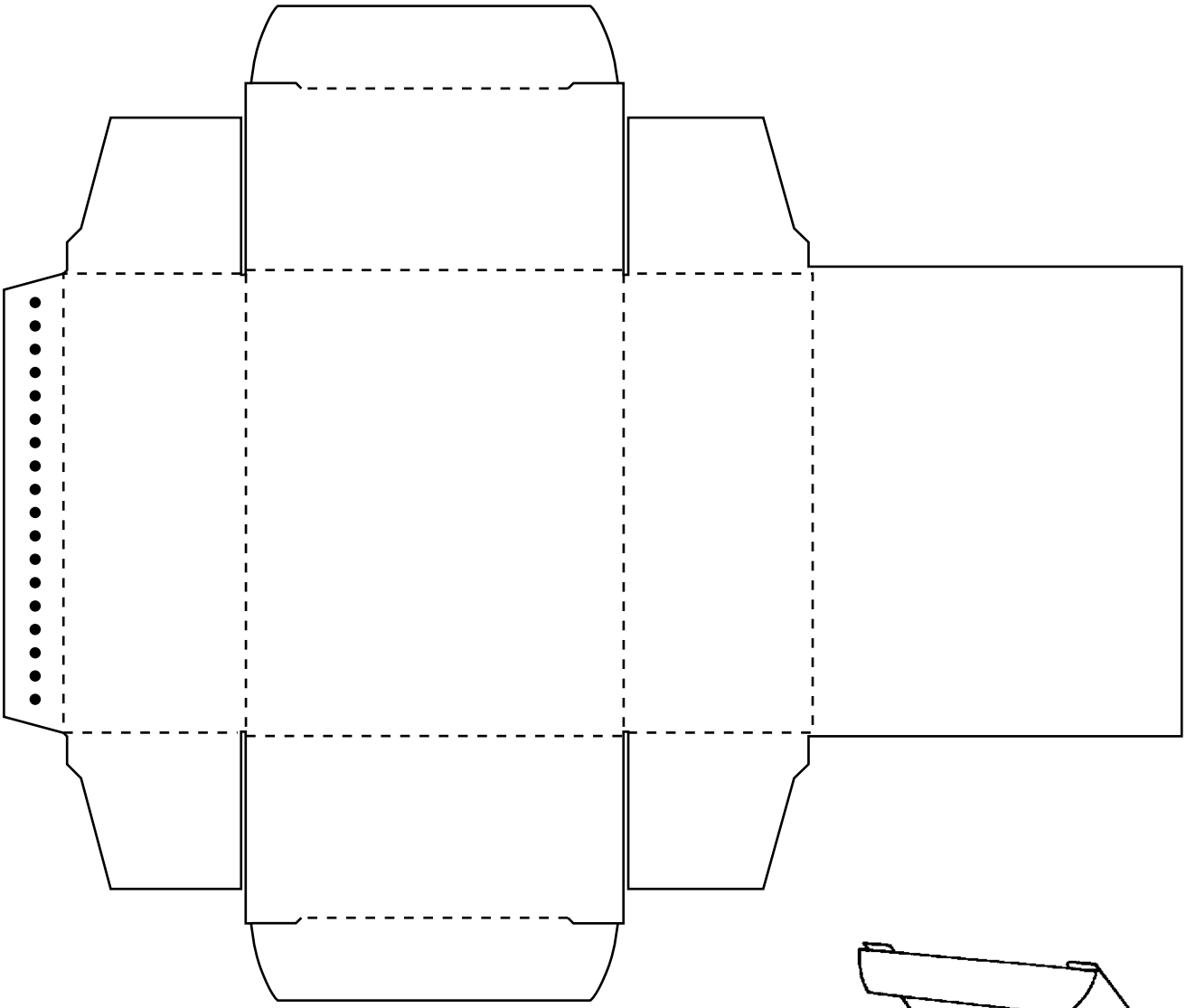


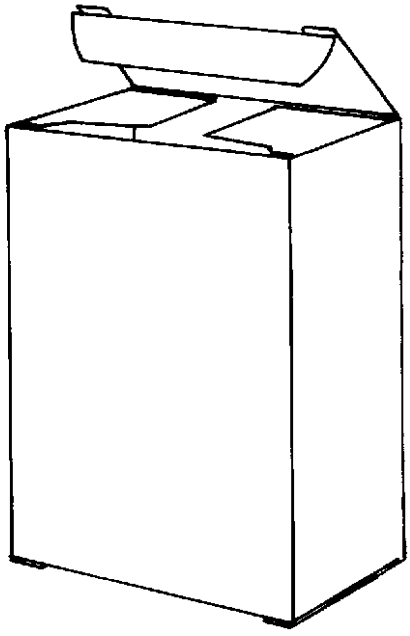


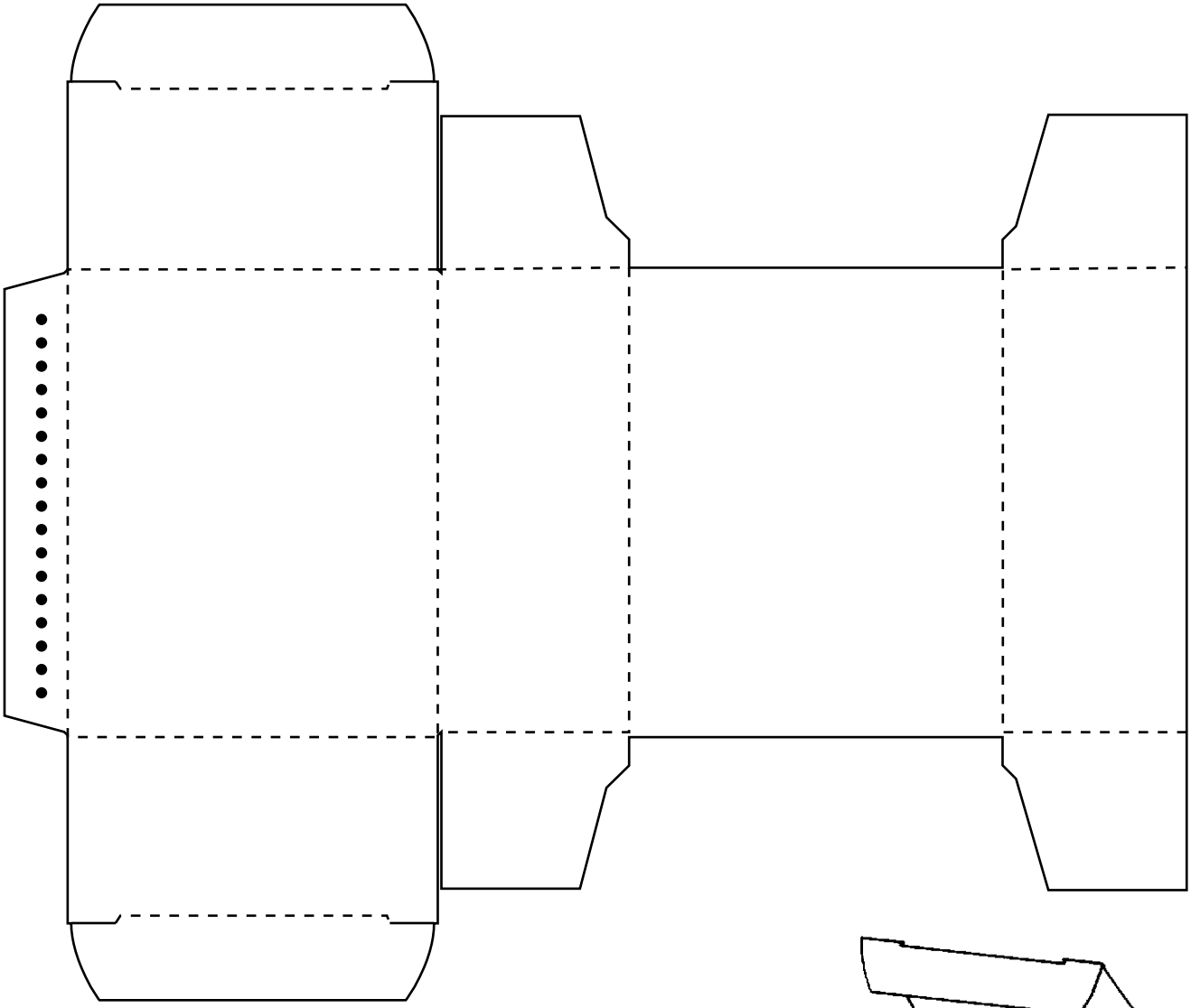


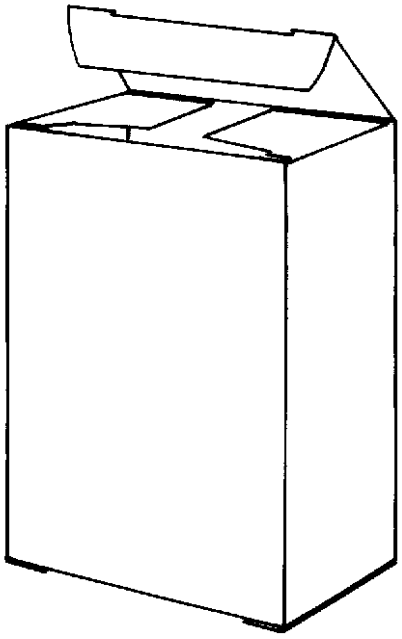


STRAIGHT TUCK WITH SLIT-LOCK TUCKS

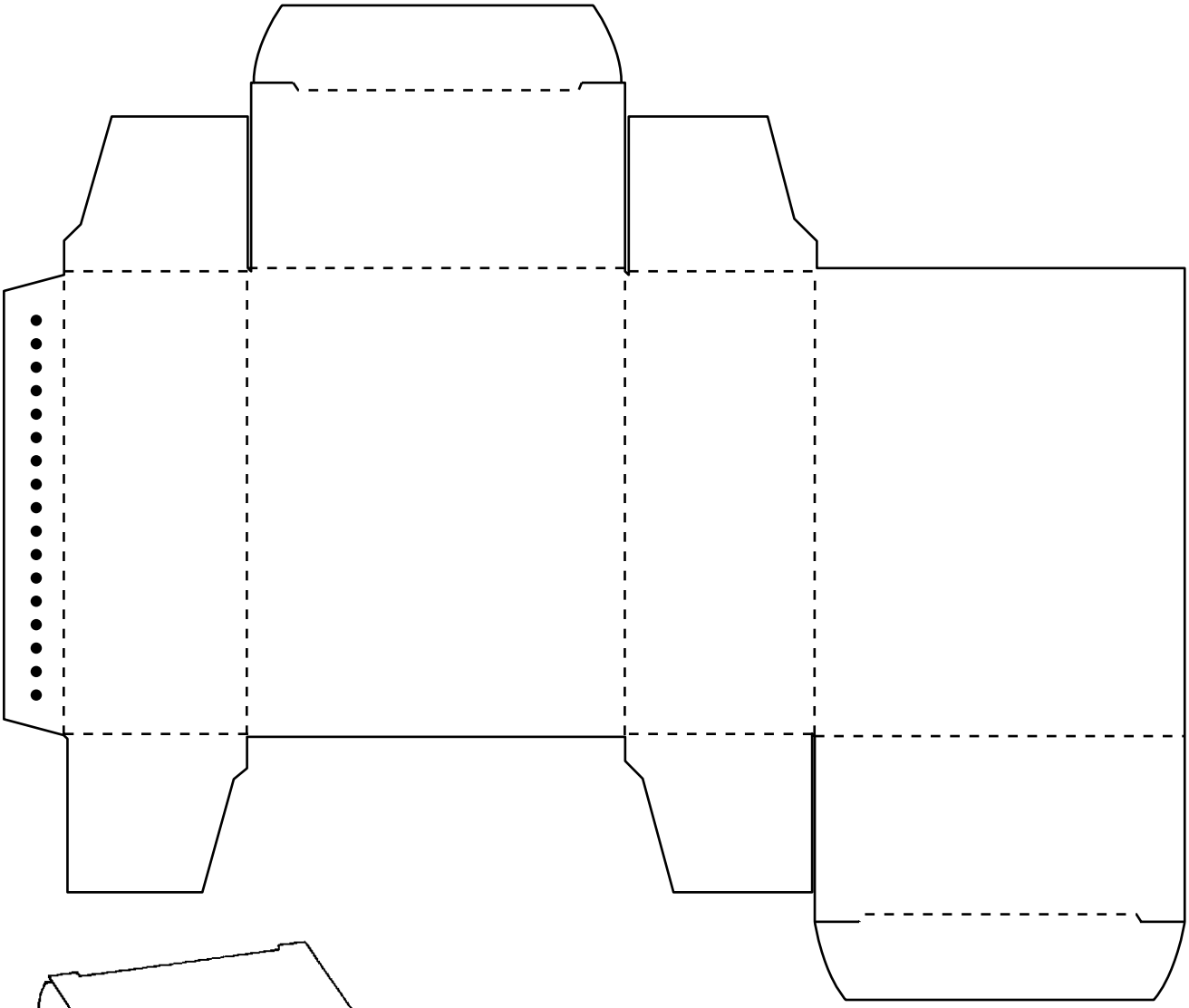


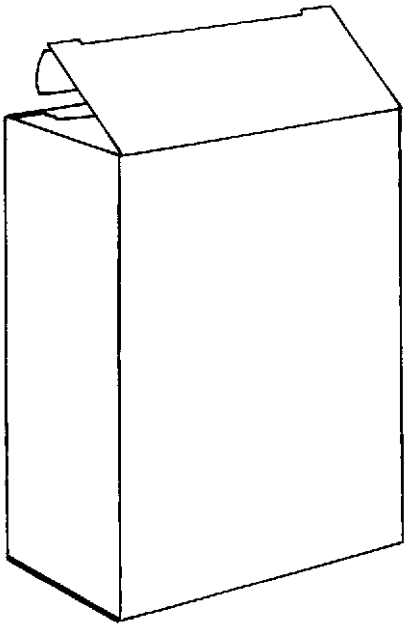


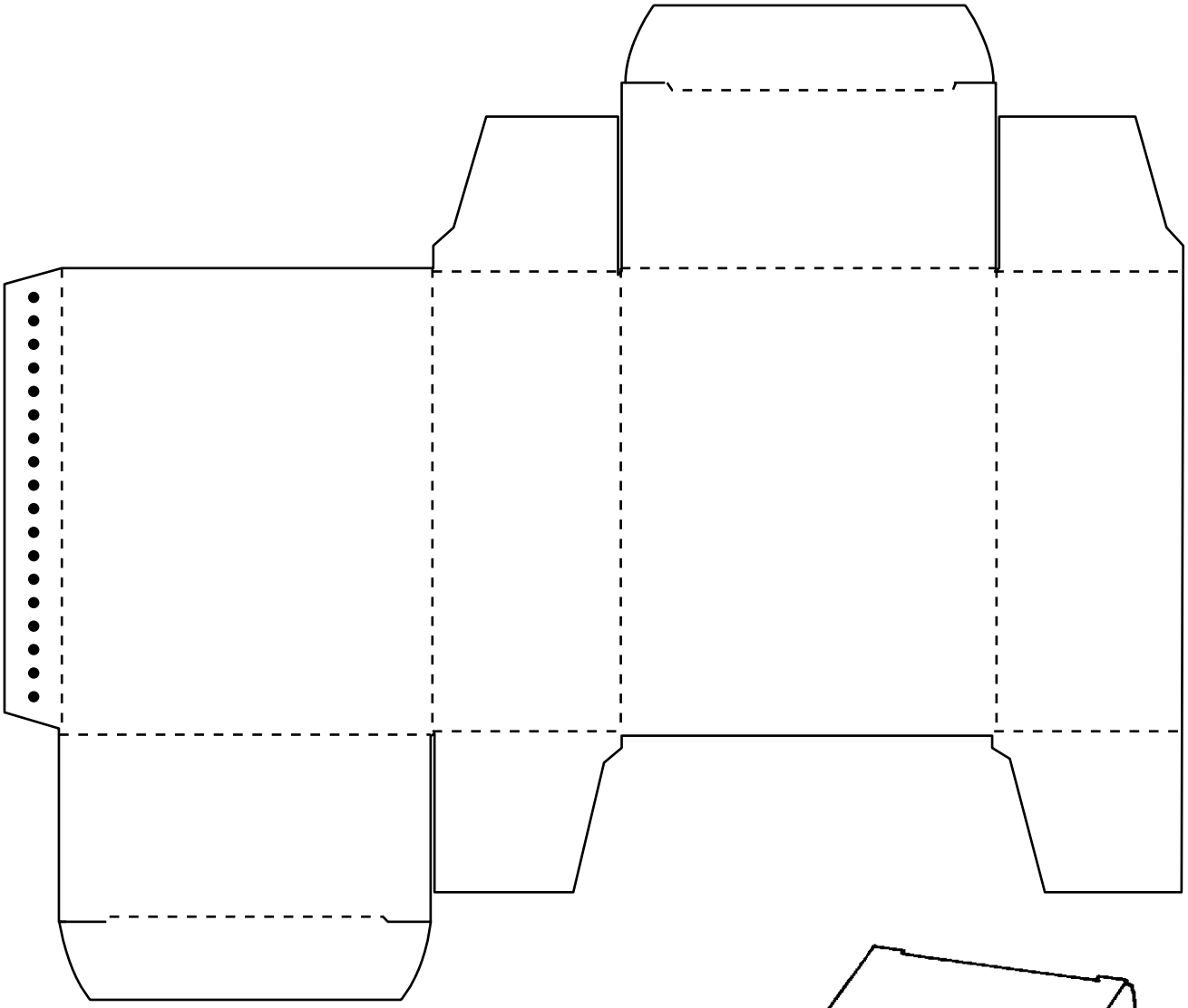


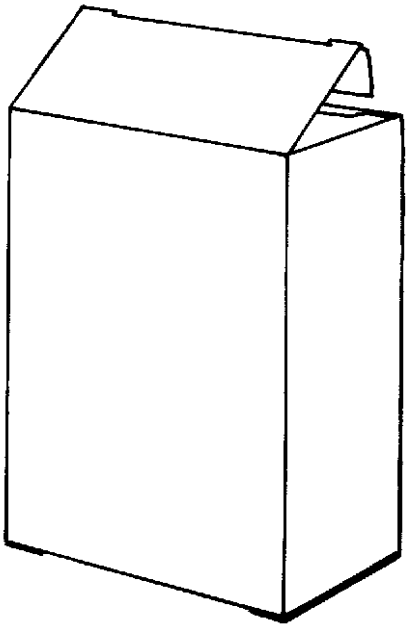


STANDARD REVERSE TUCK

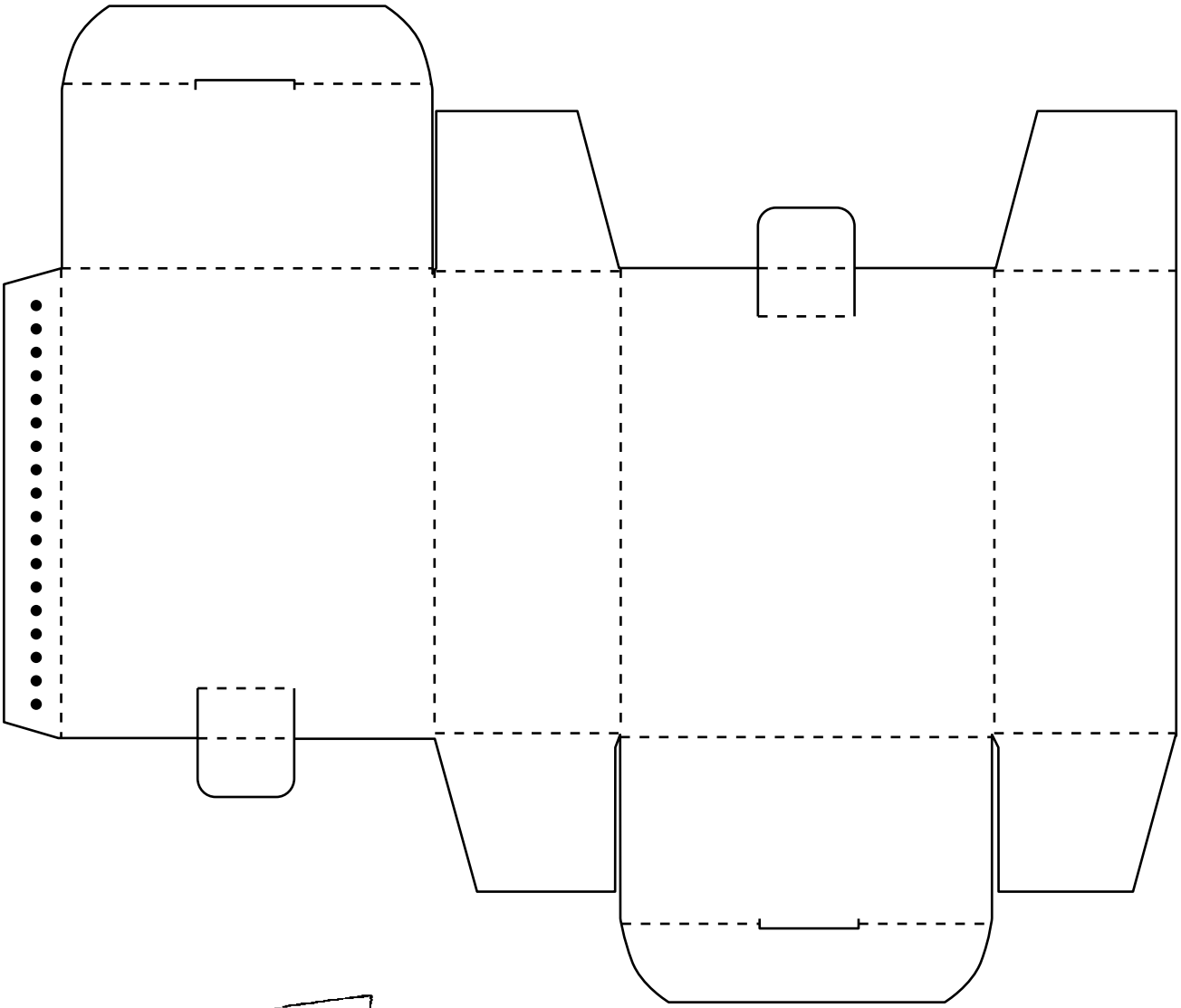


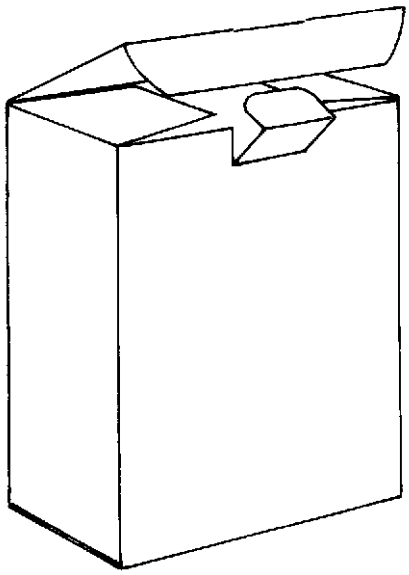


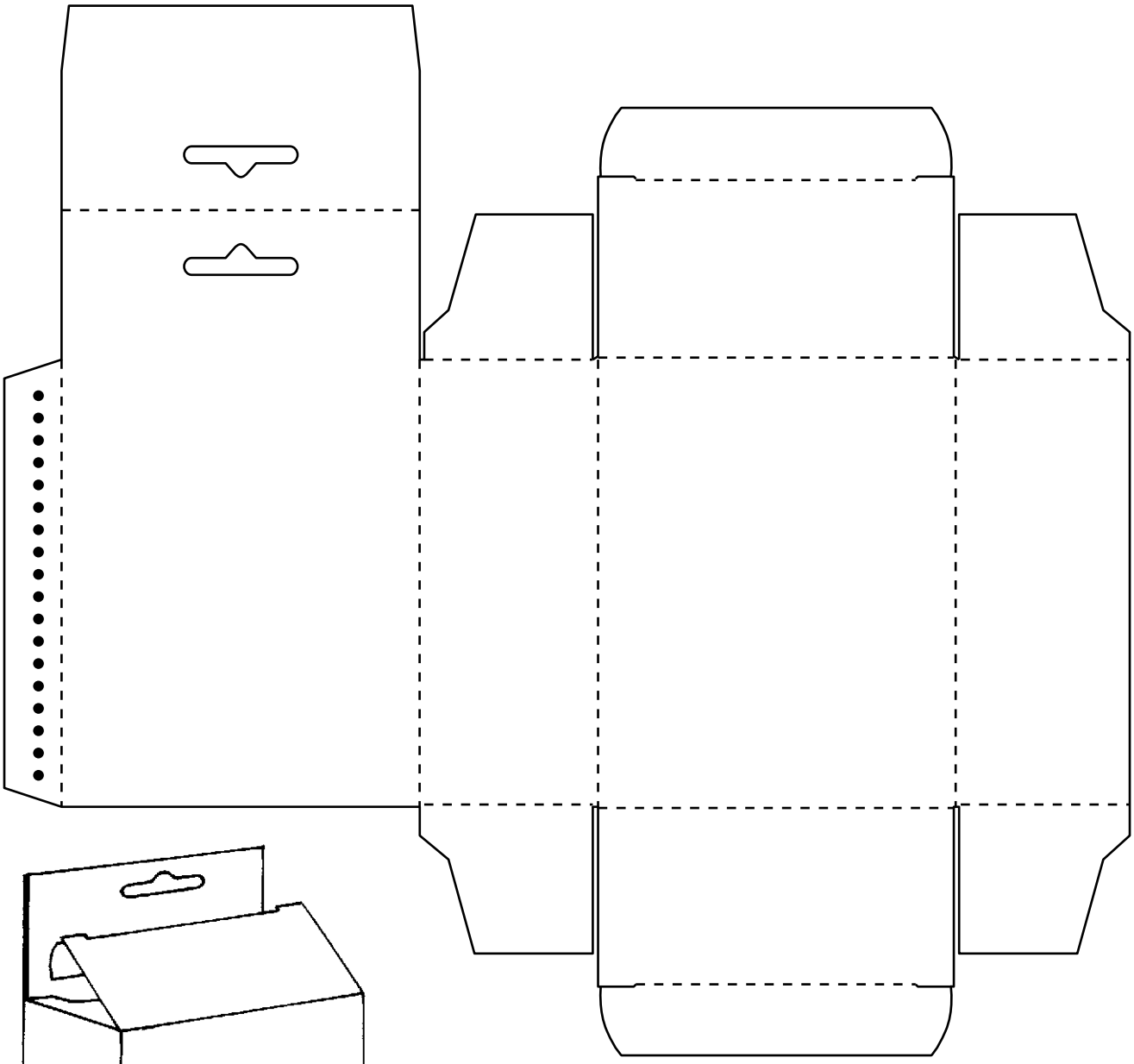


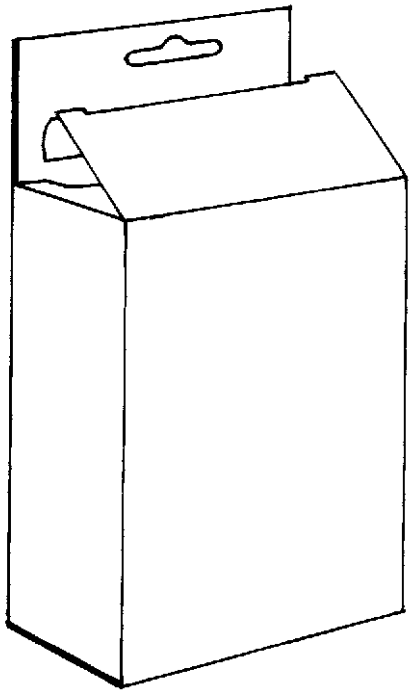


TUCK AND TONGUE

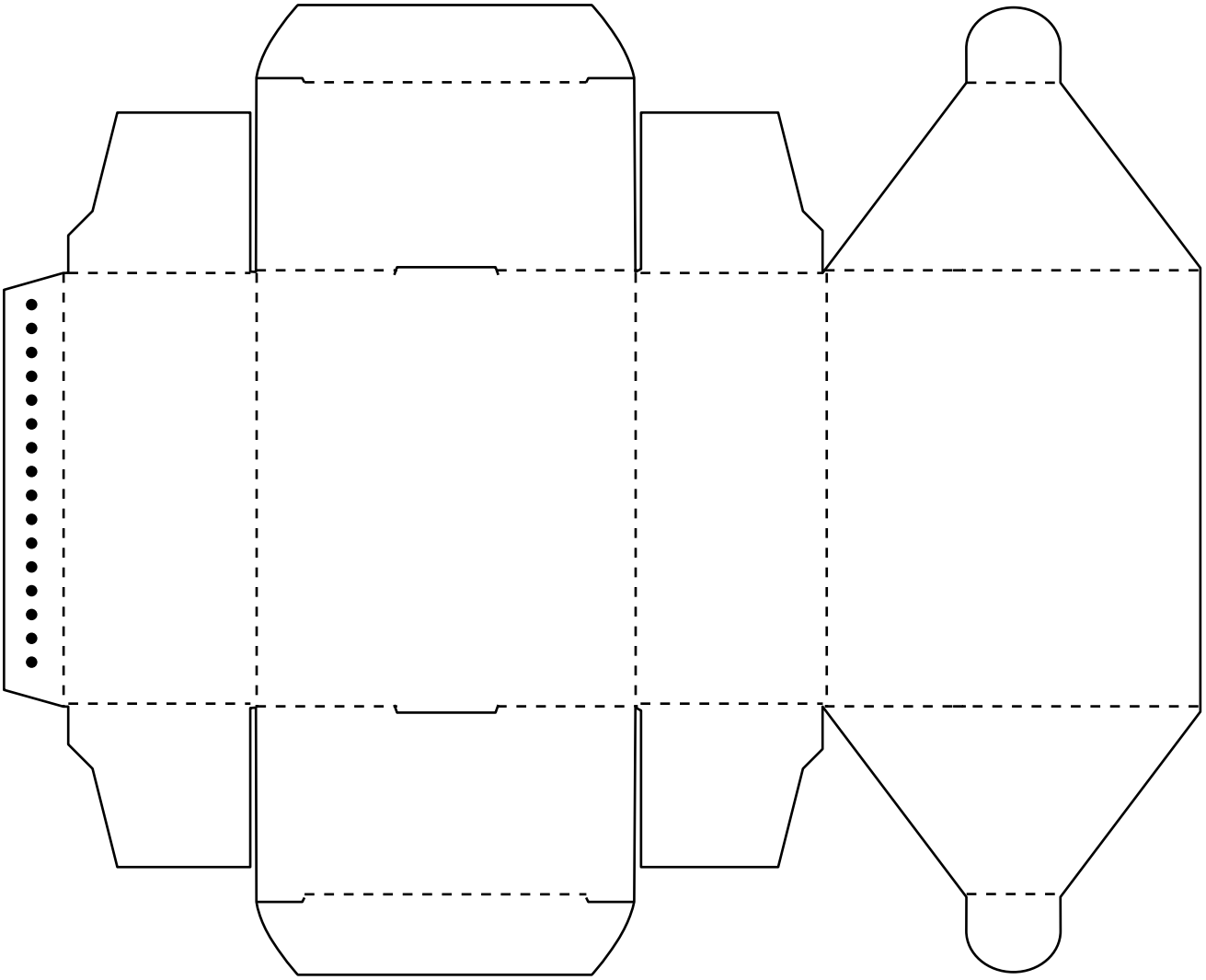


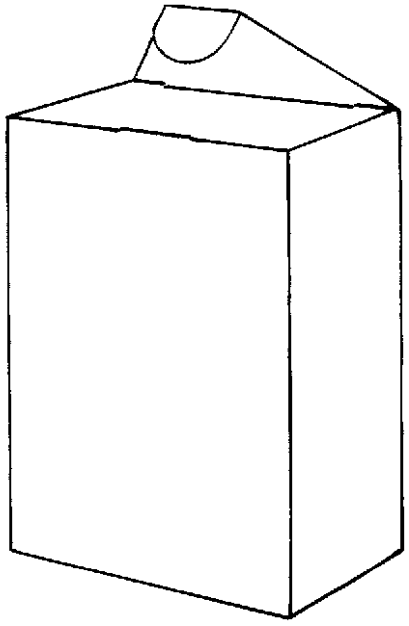


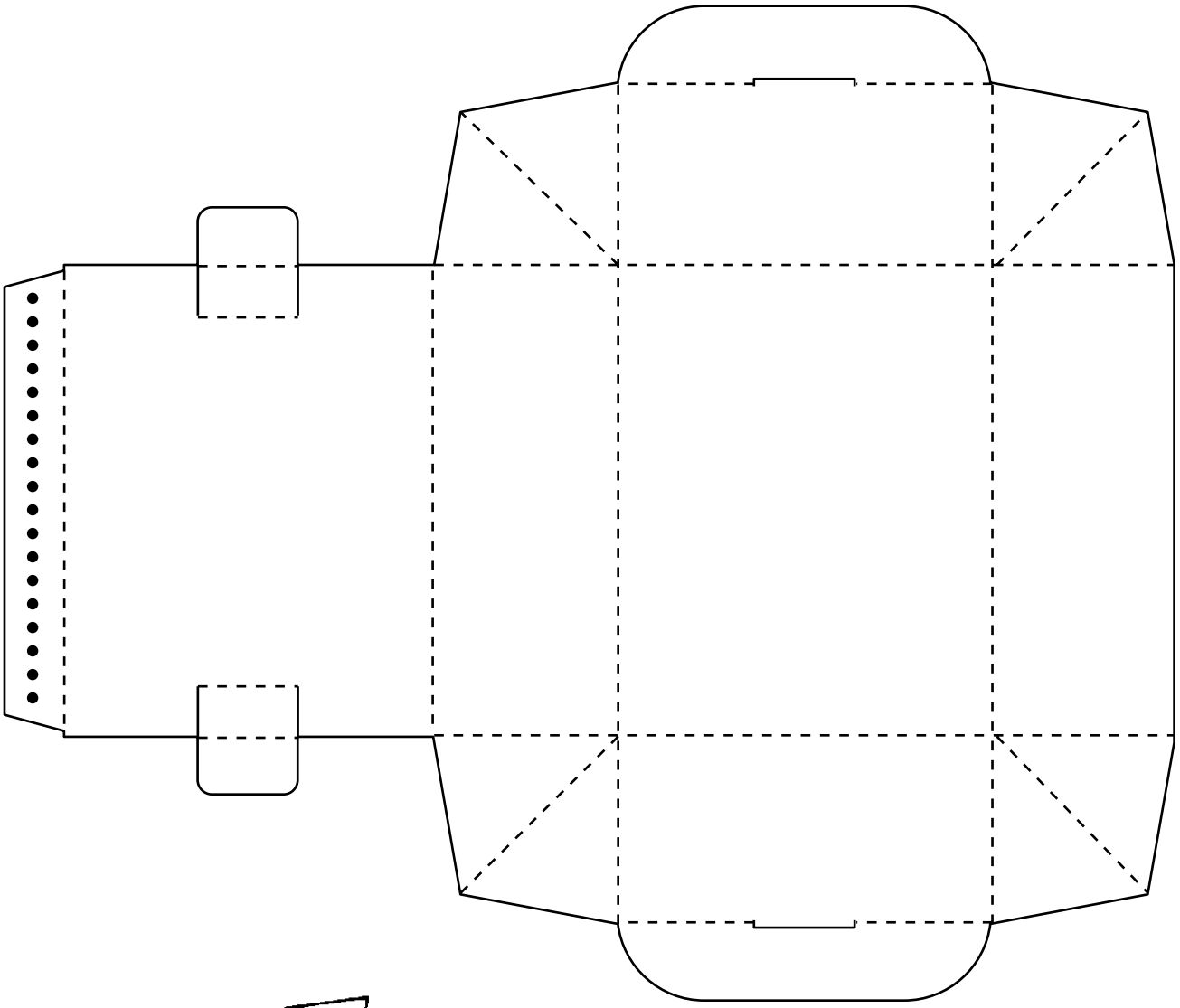


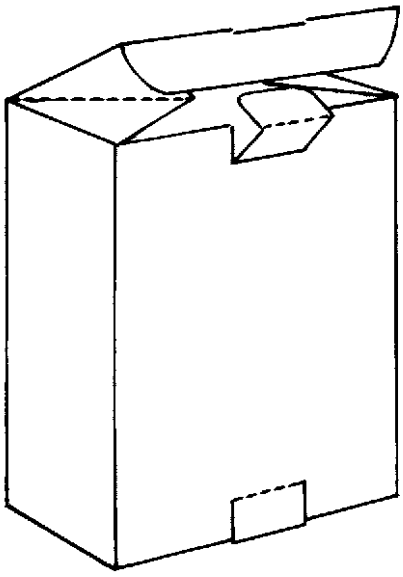


MAILER LOCK

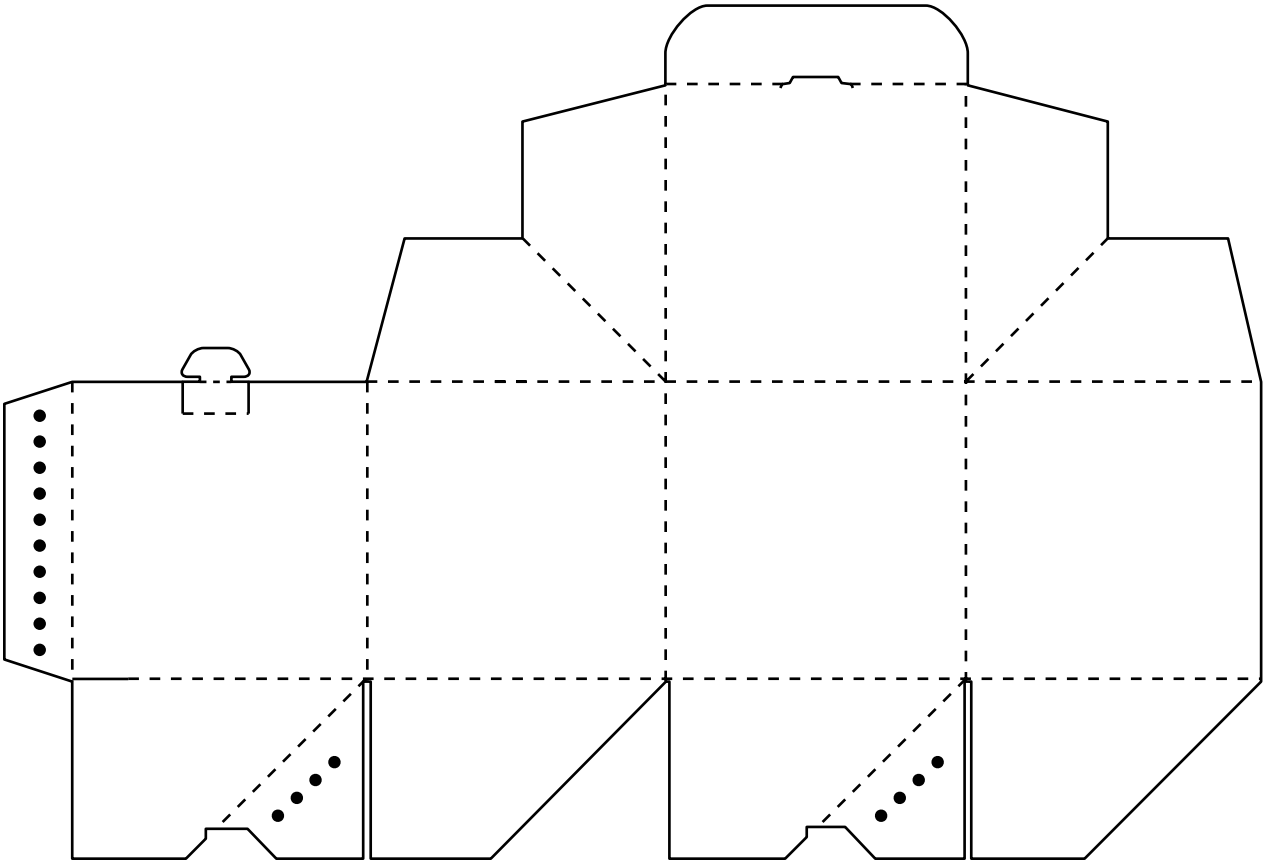


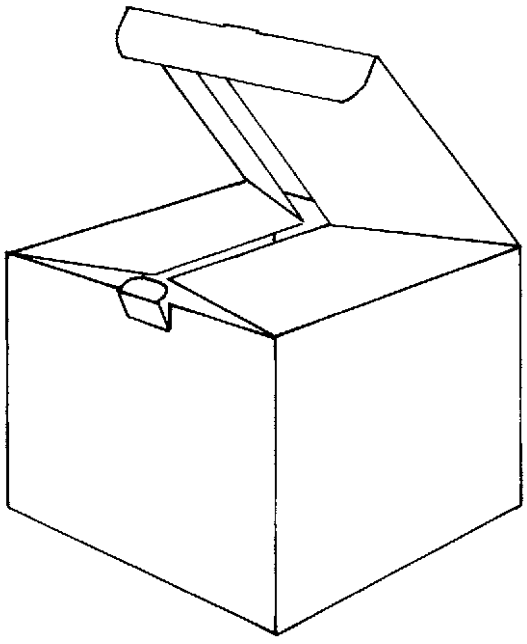


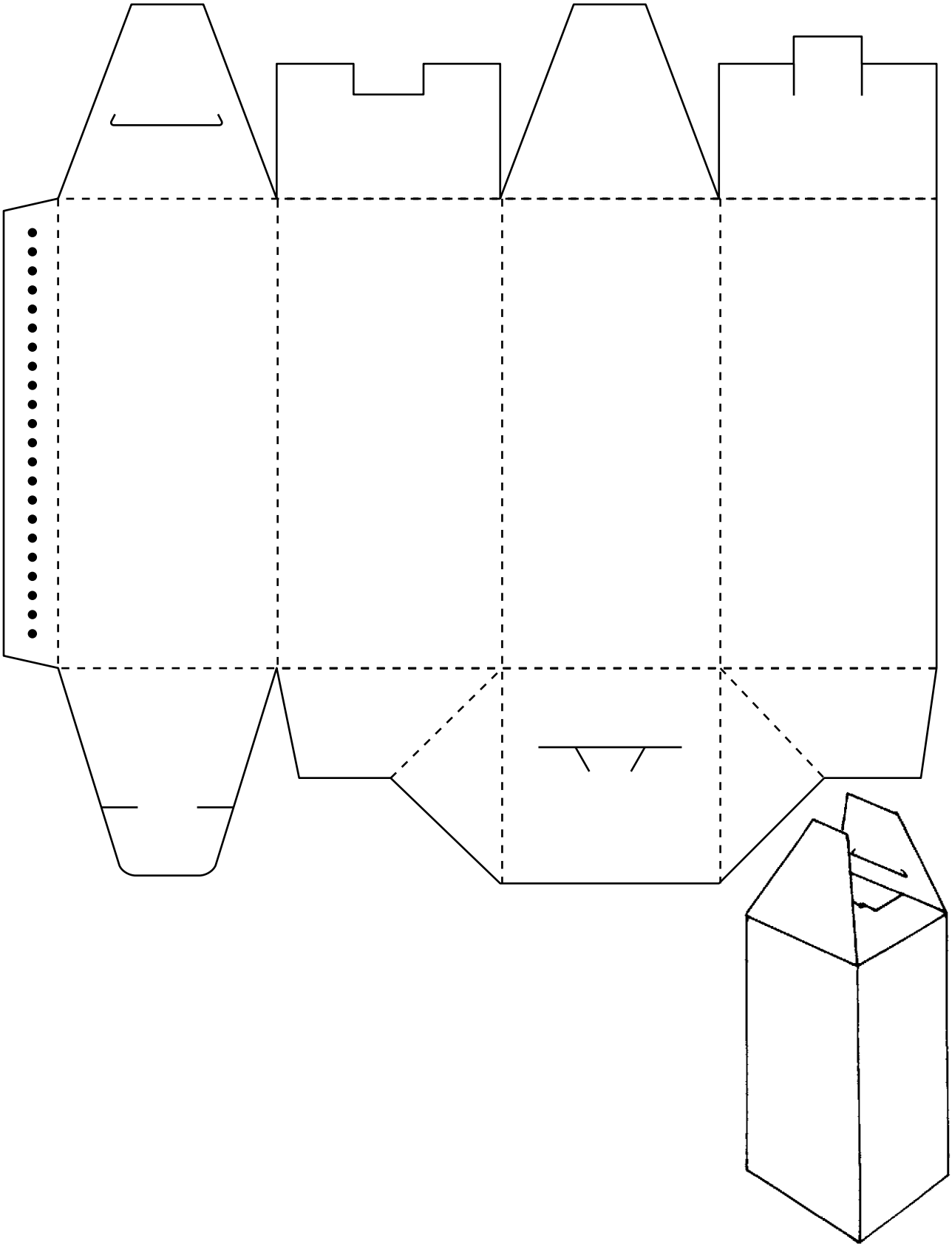




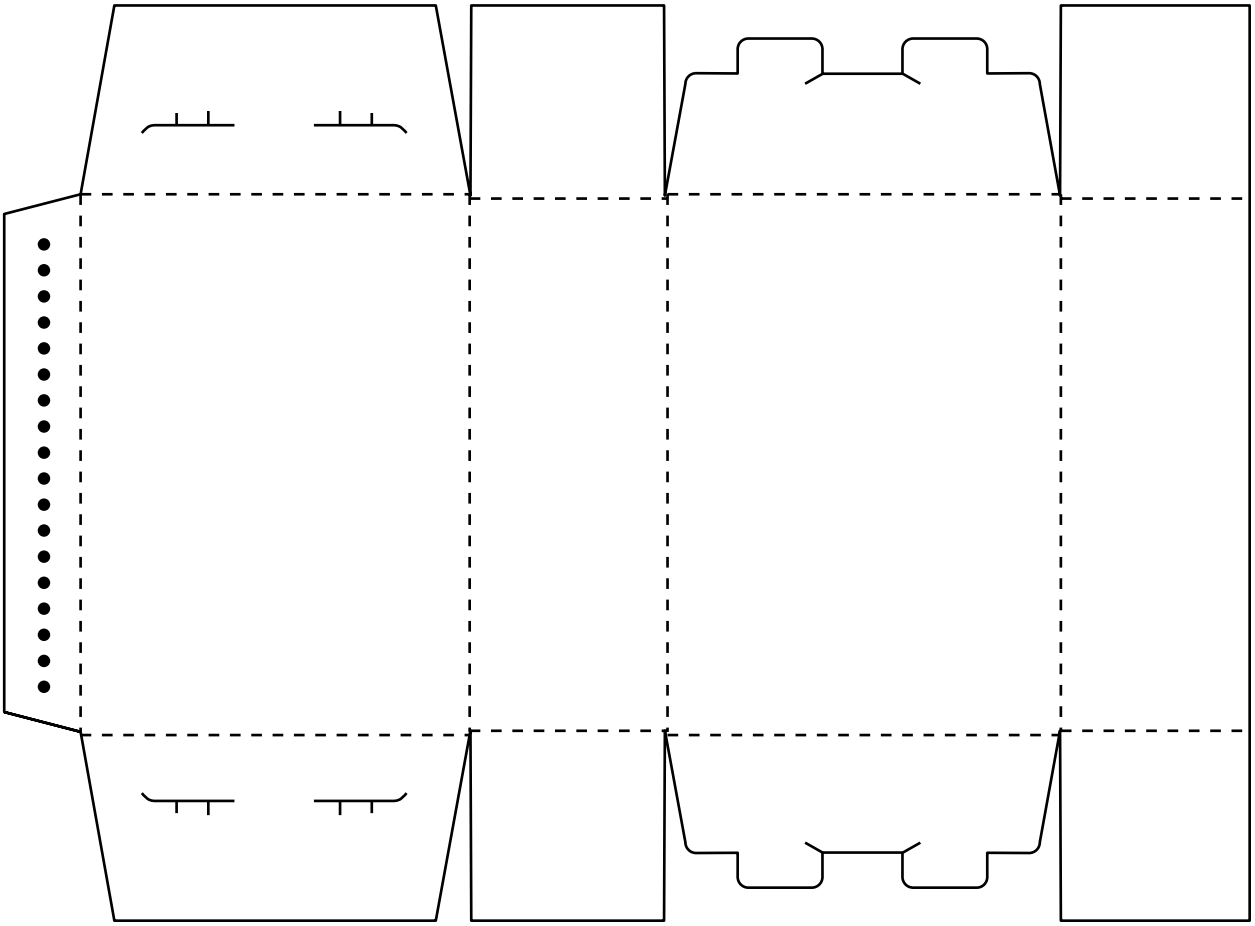
BELLOWS TUCK TOP, HIMES LOCK AUTOMATIC BOTTOM
(ALSO KNOWN AS CRASH LOCK)

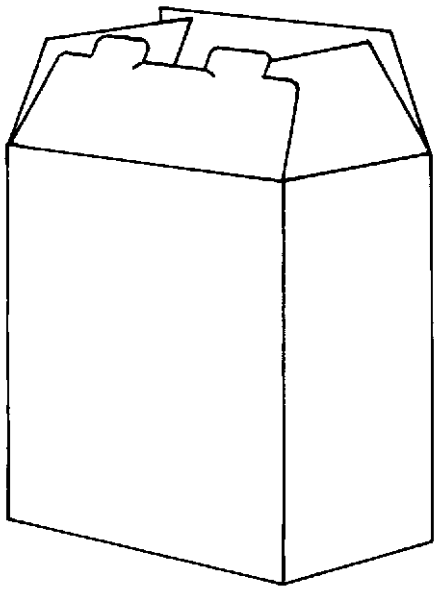


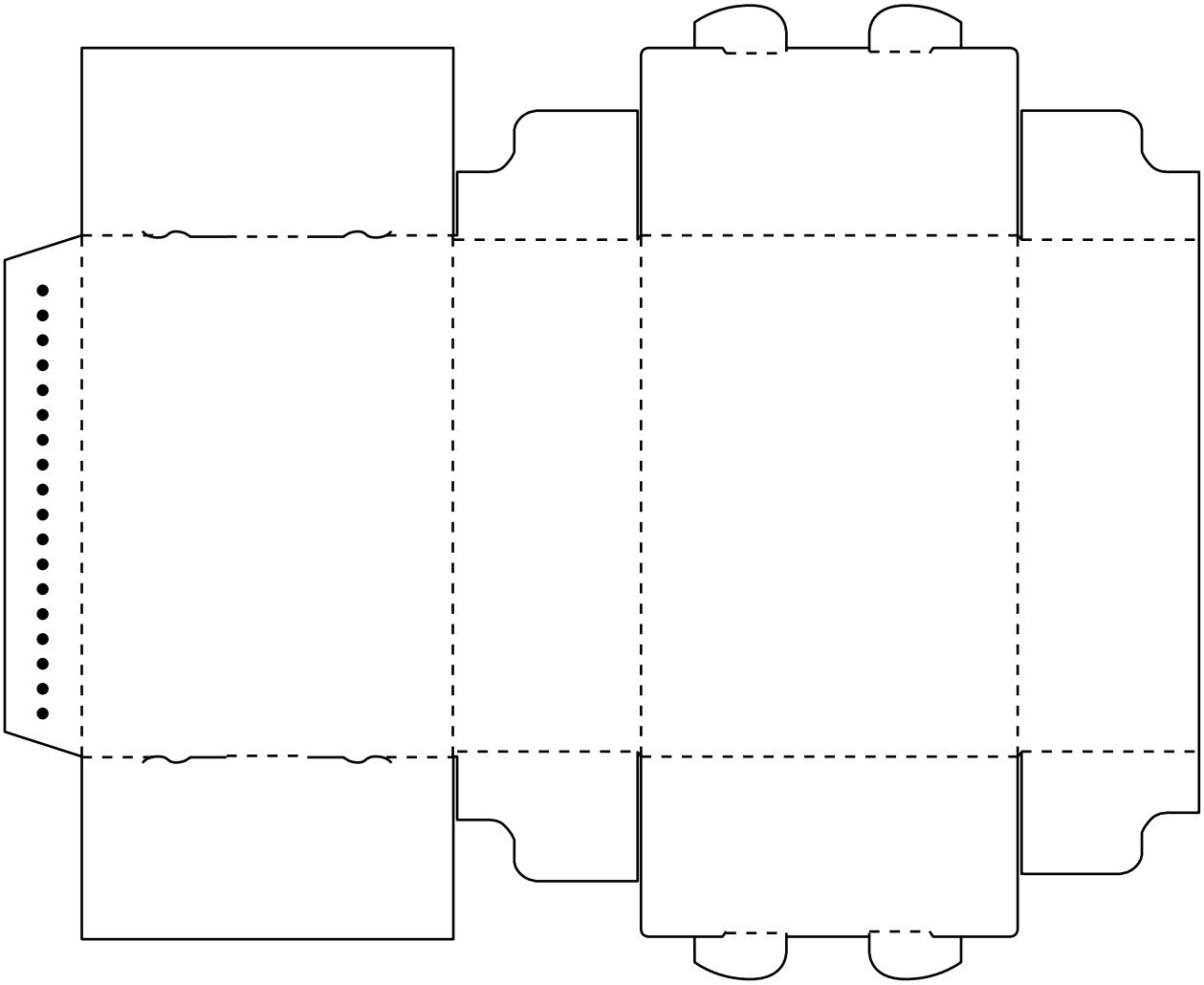


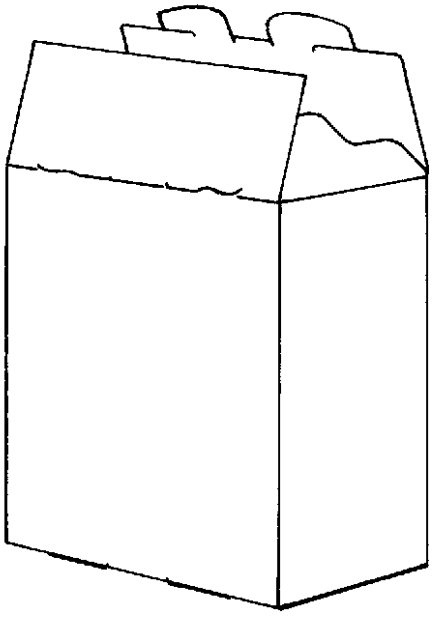


OPEN THROAT WITH TUCK LOCKS

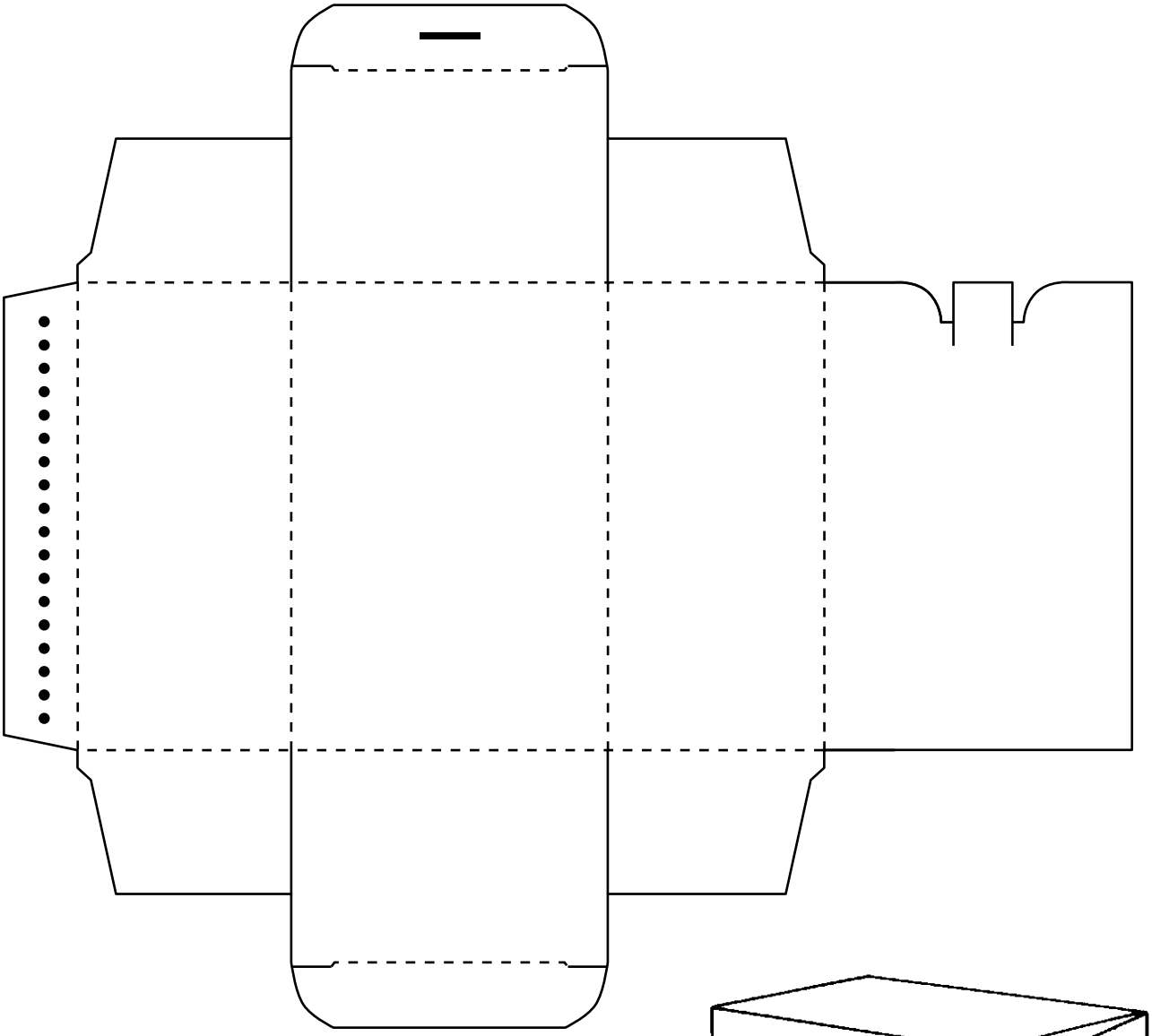


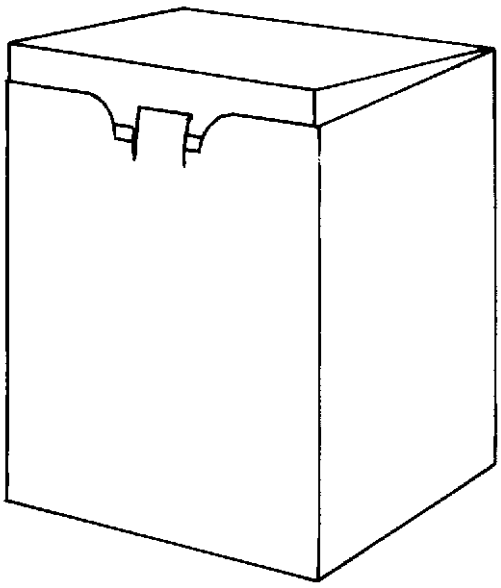


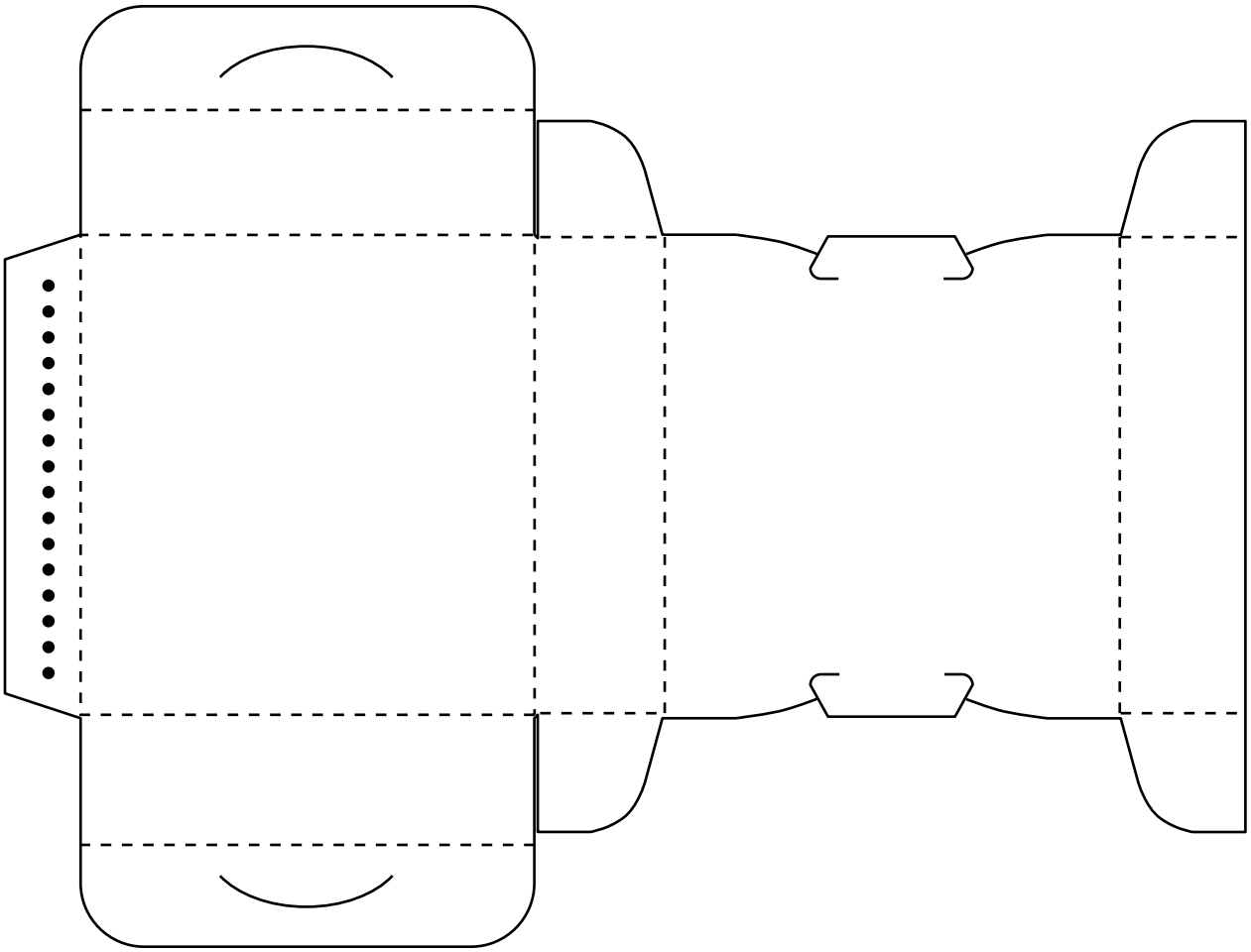


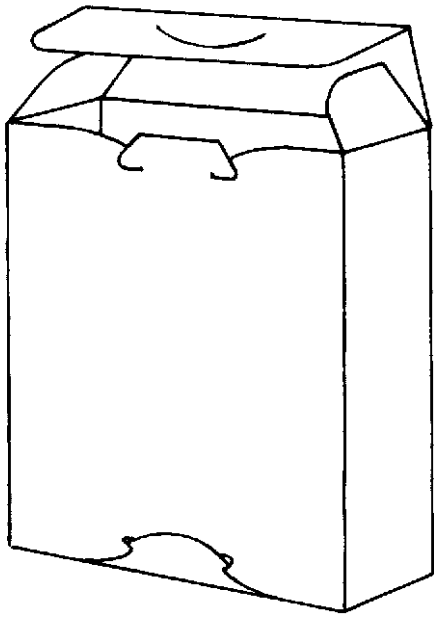


STRAIGHT TUCK WITH DRUGSTORE LOCK

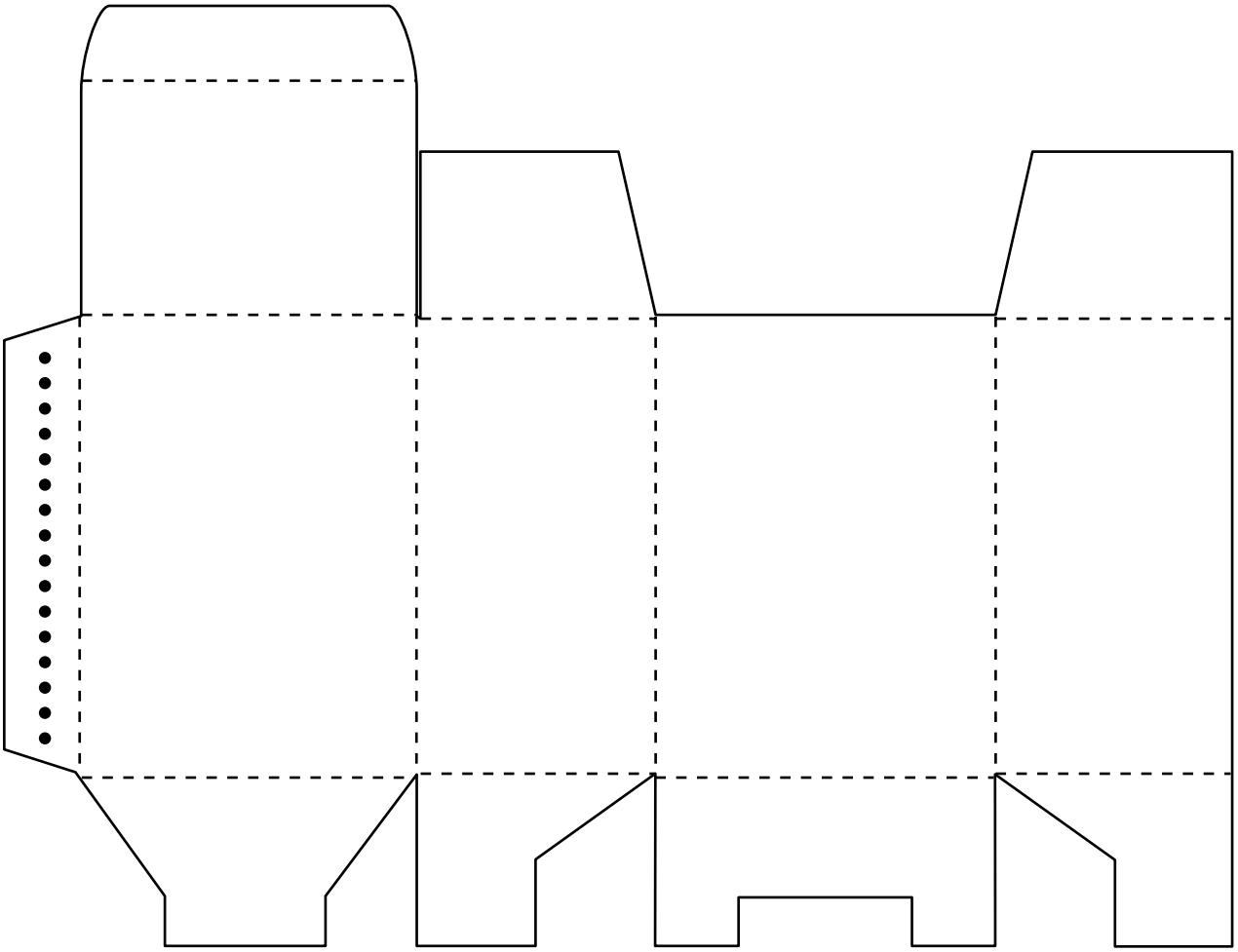


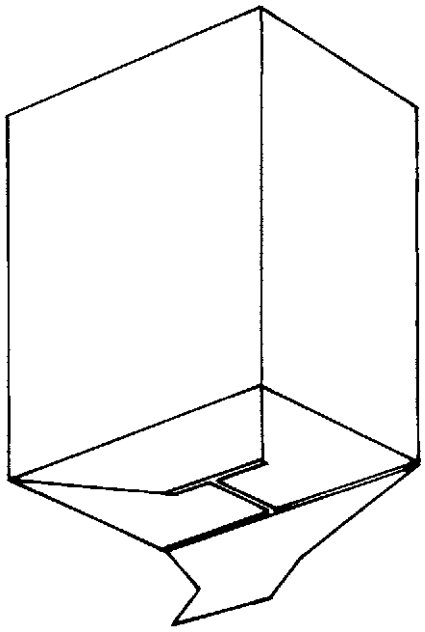


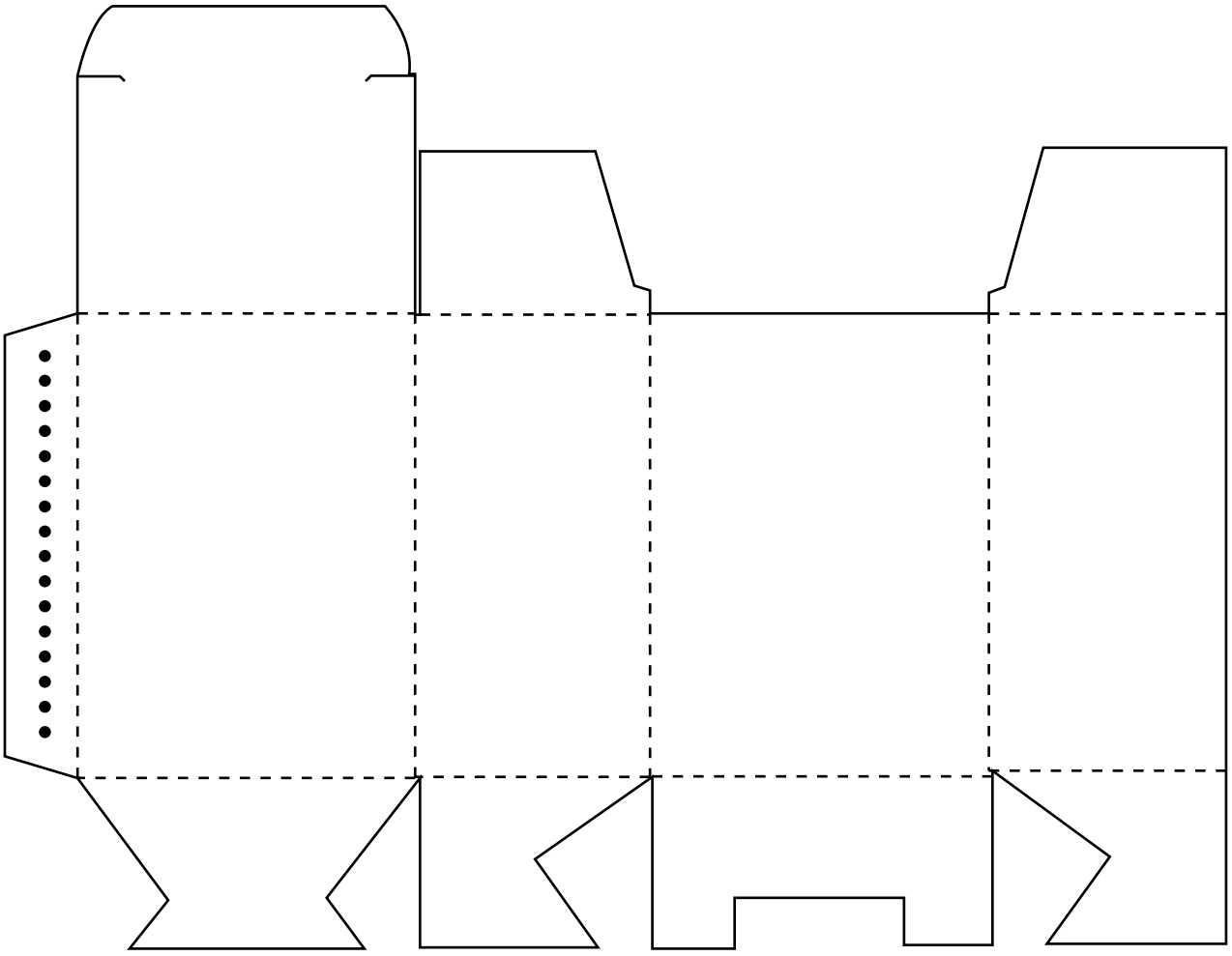


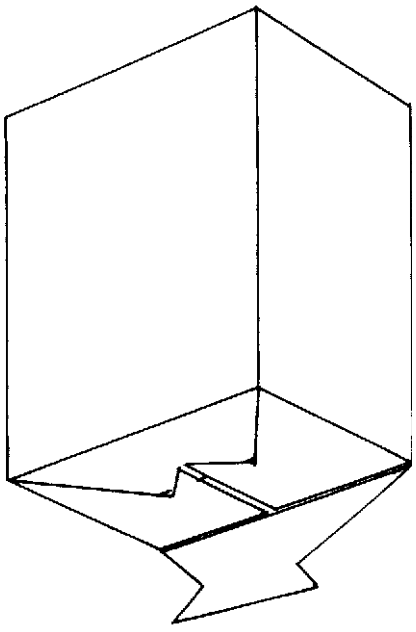


FRICTION TUCK TOP, SNAP-LOCK (OR HOUGHLAND) BOTTOM

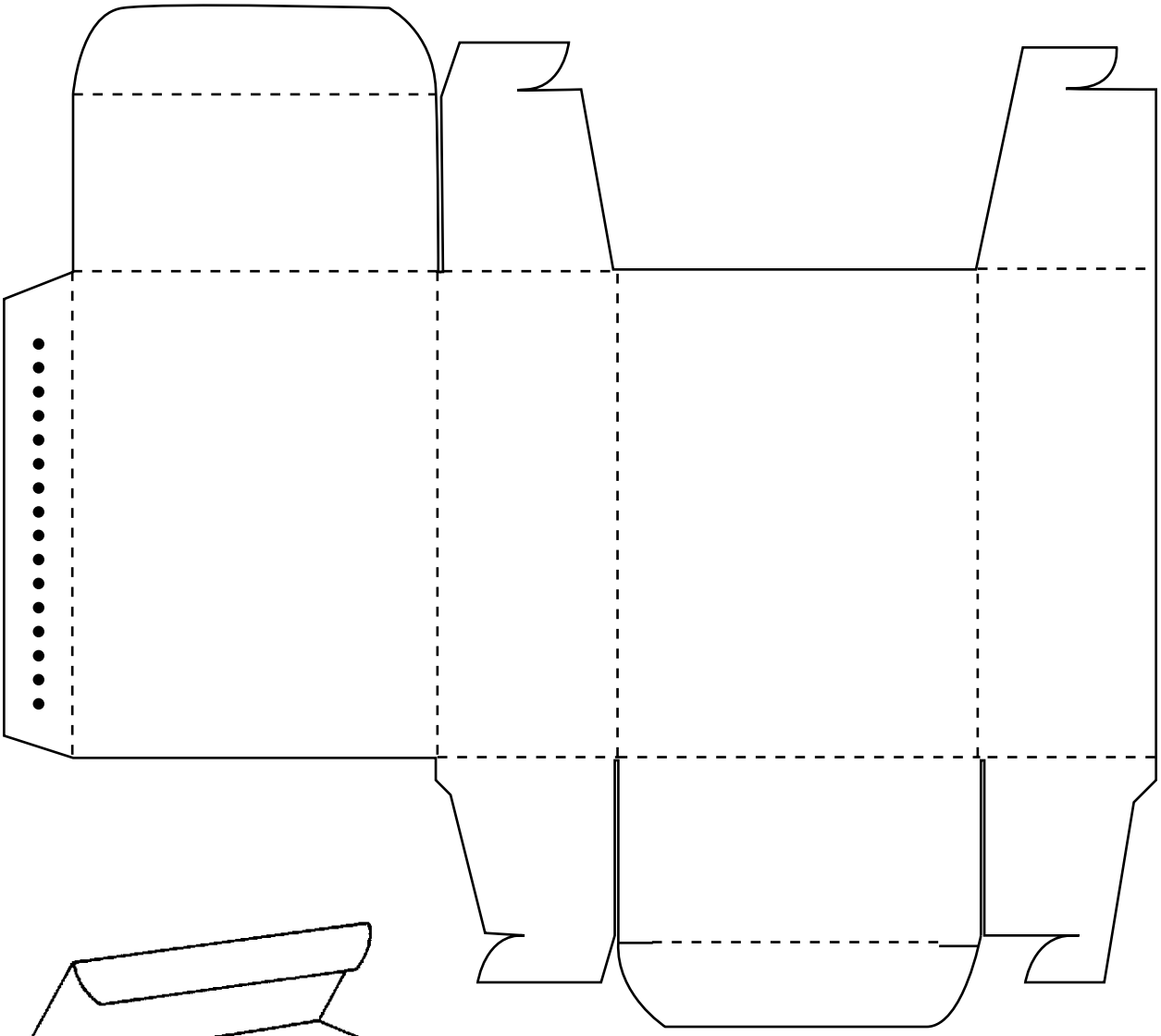


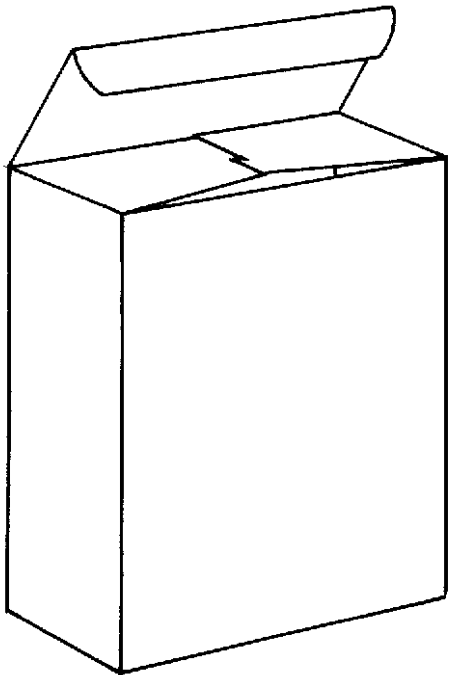


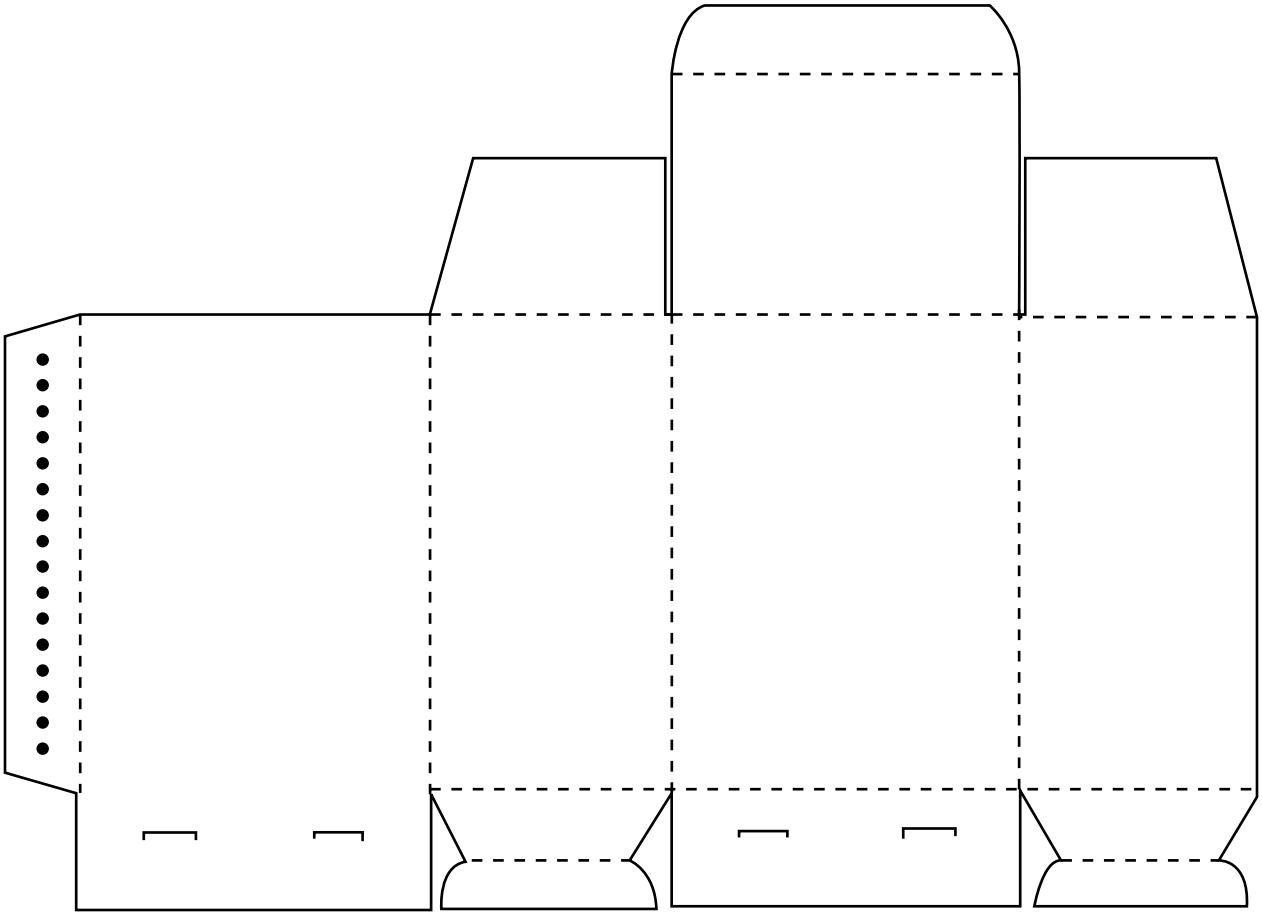


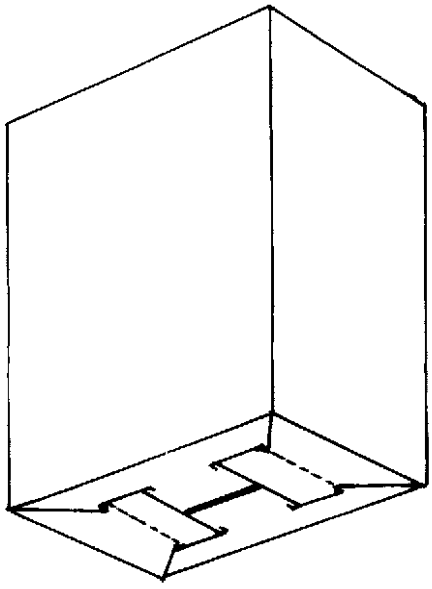


COMBINATION ARTHUR LOCK WITH REVERSE TUCK

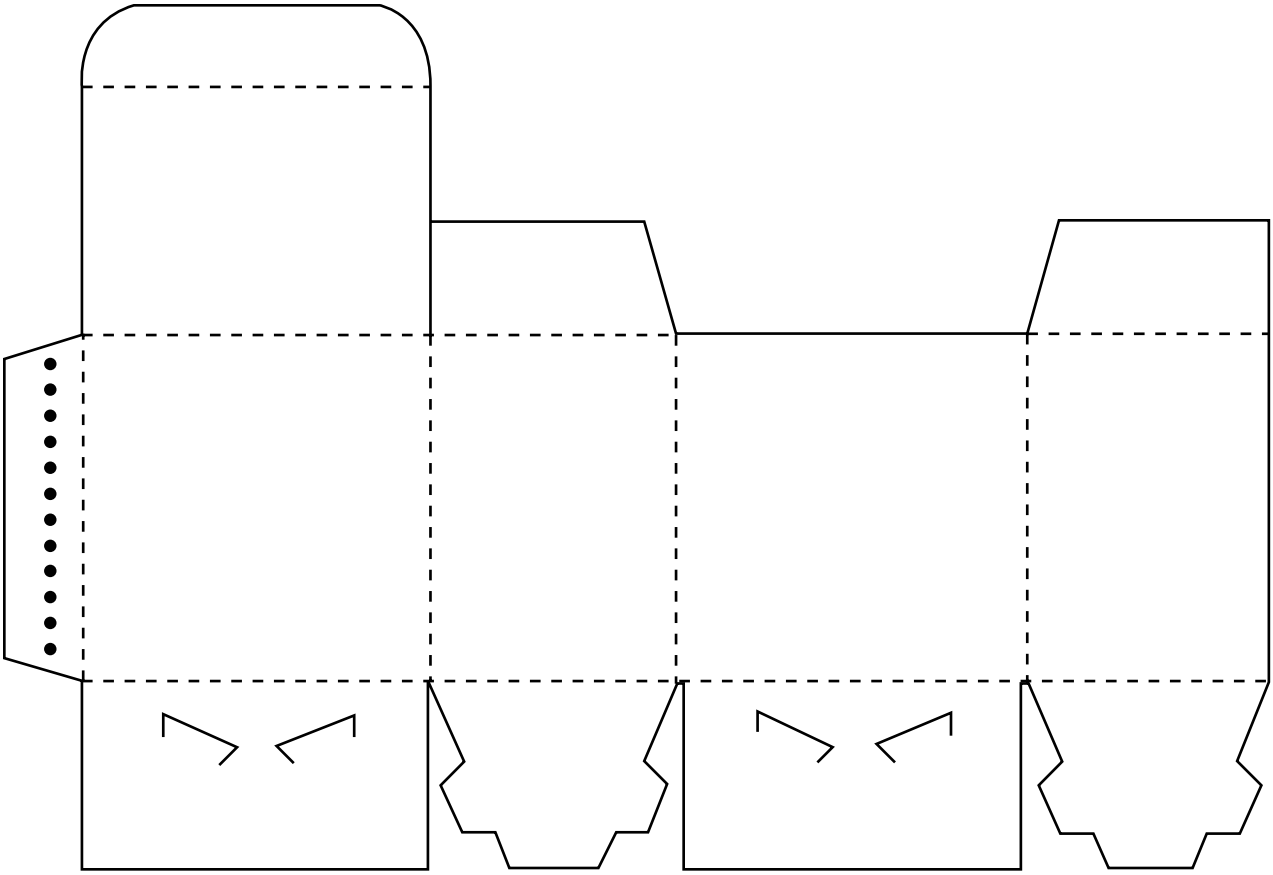


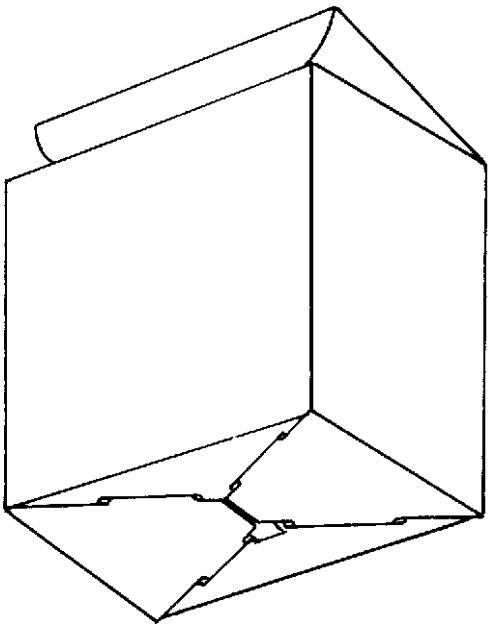


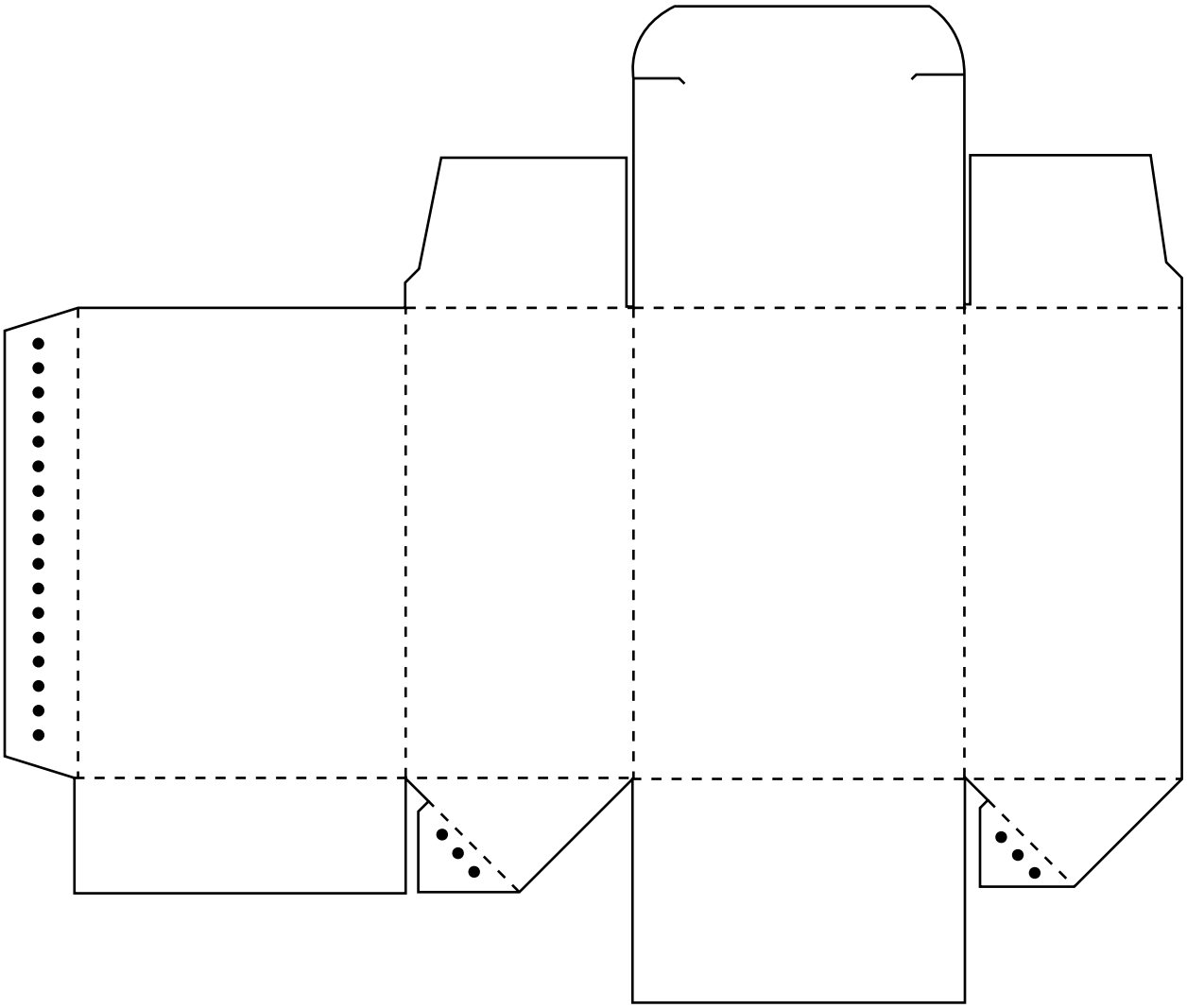


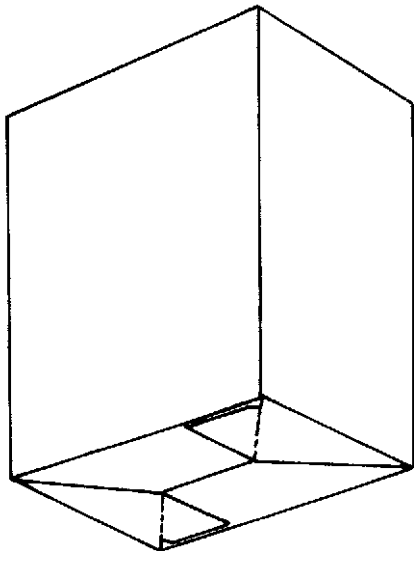


EAR-HOOK BOTTOM VARIATION

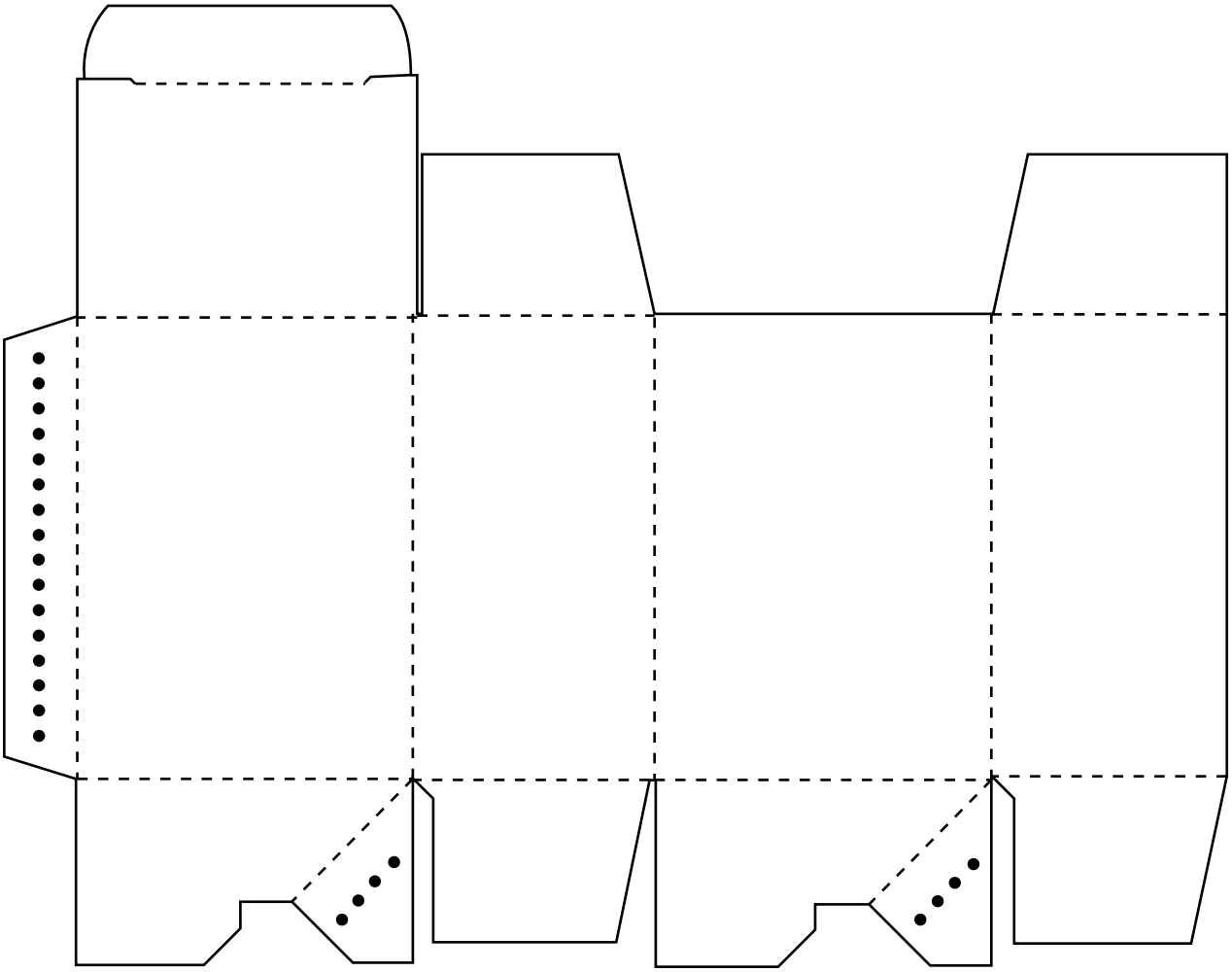


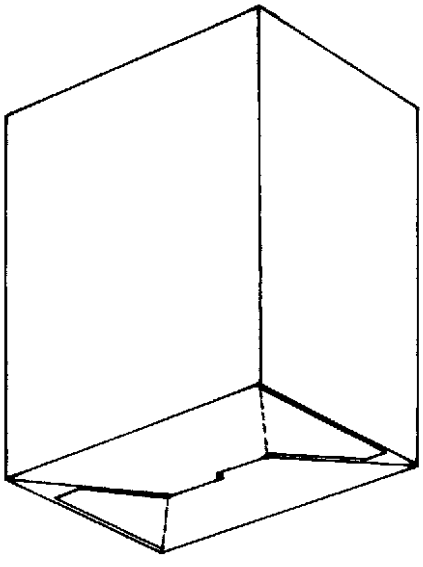


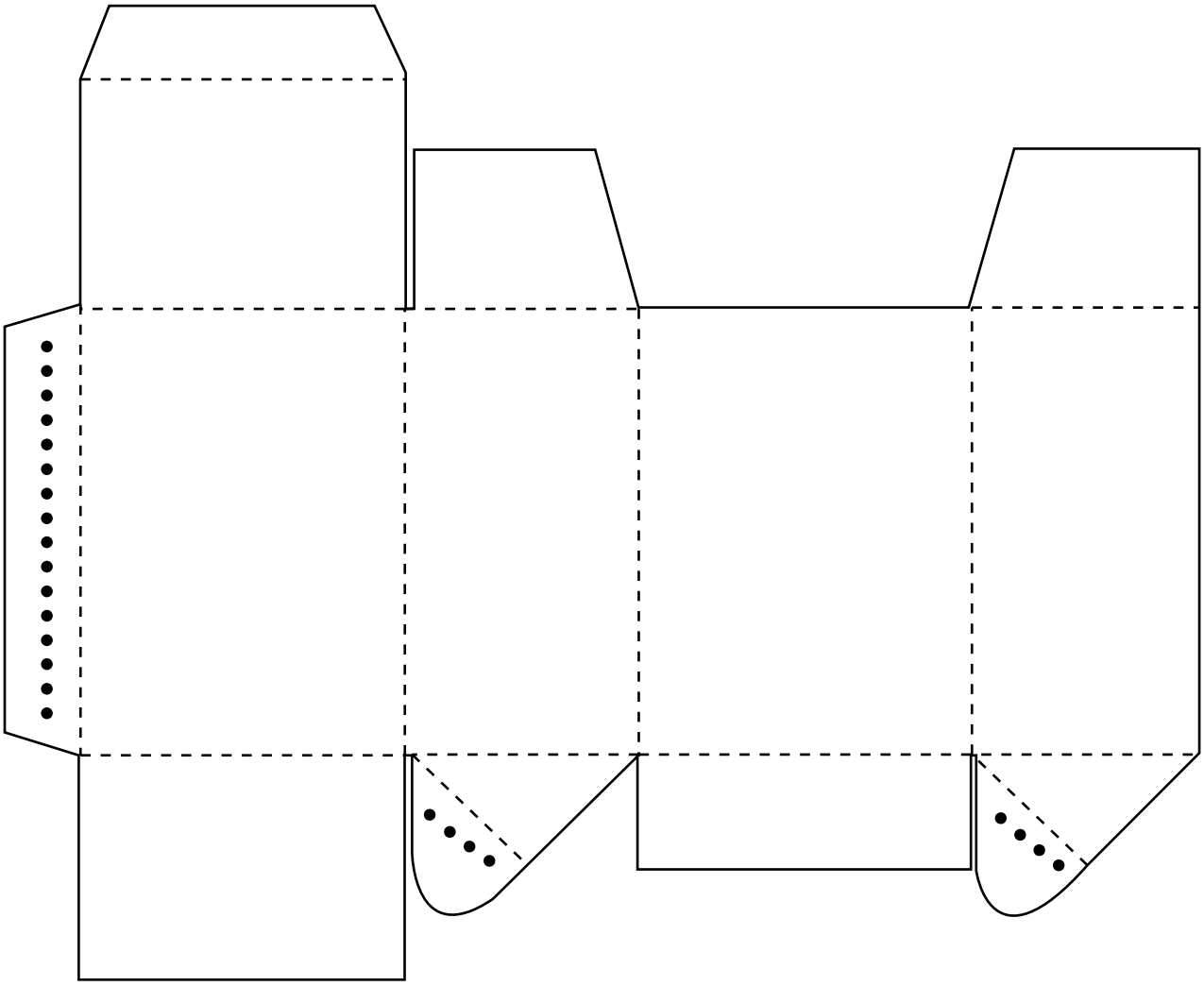


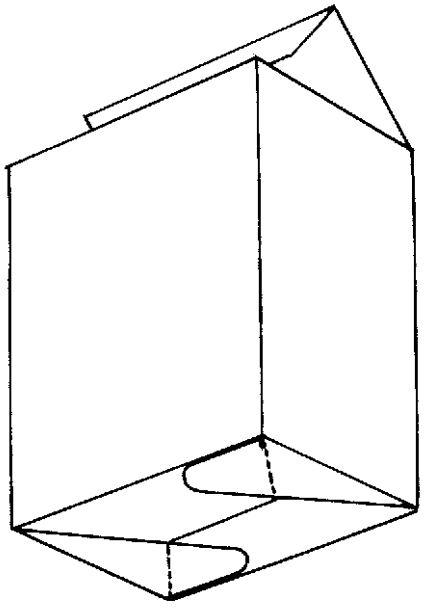


HIMES LOCK (POPCORN) BOTTOM

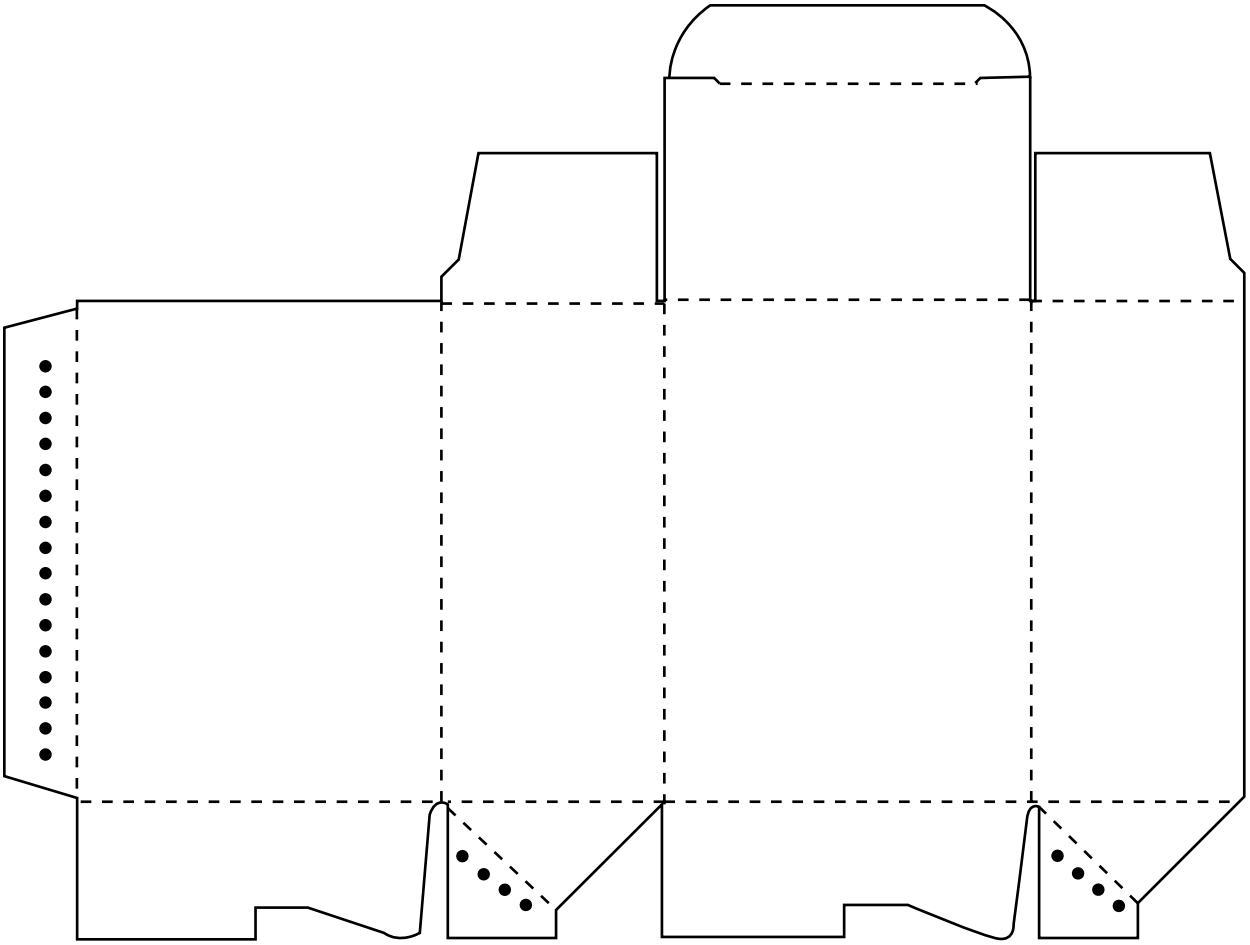


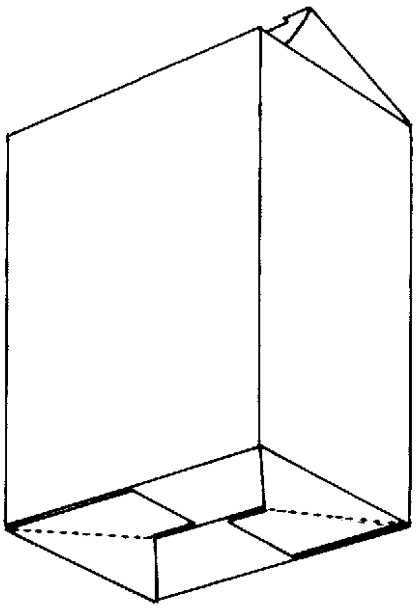


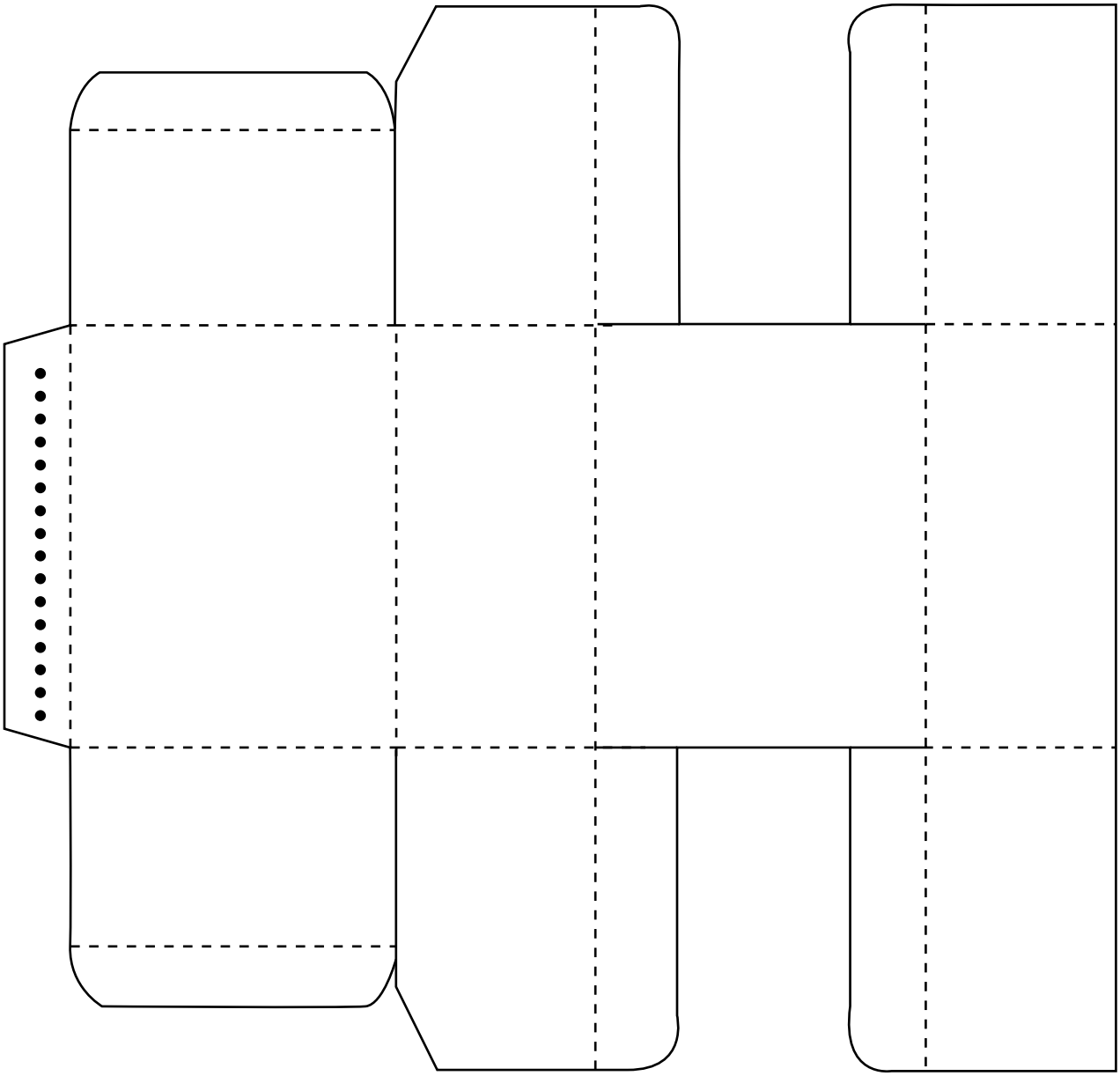


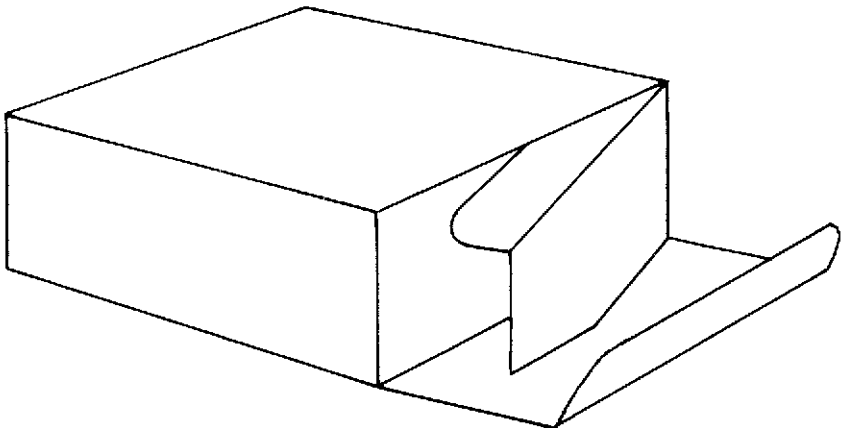


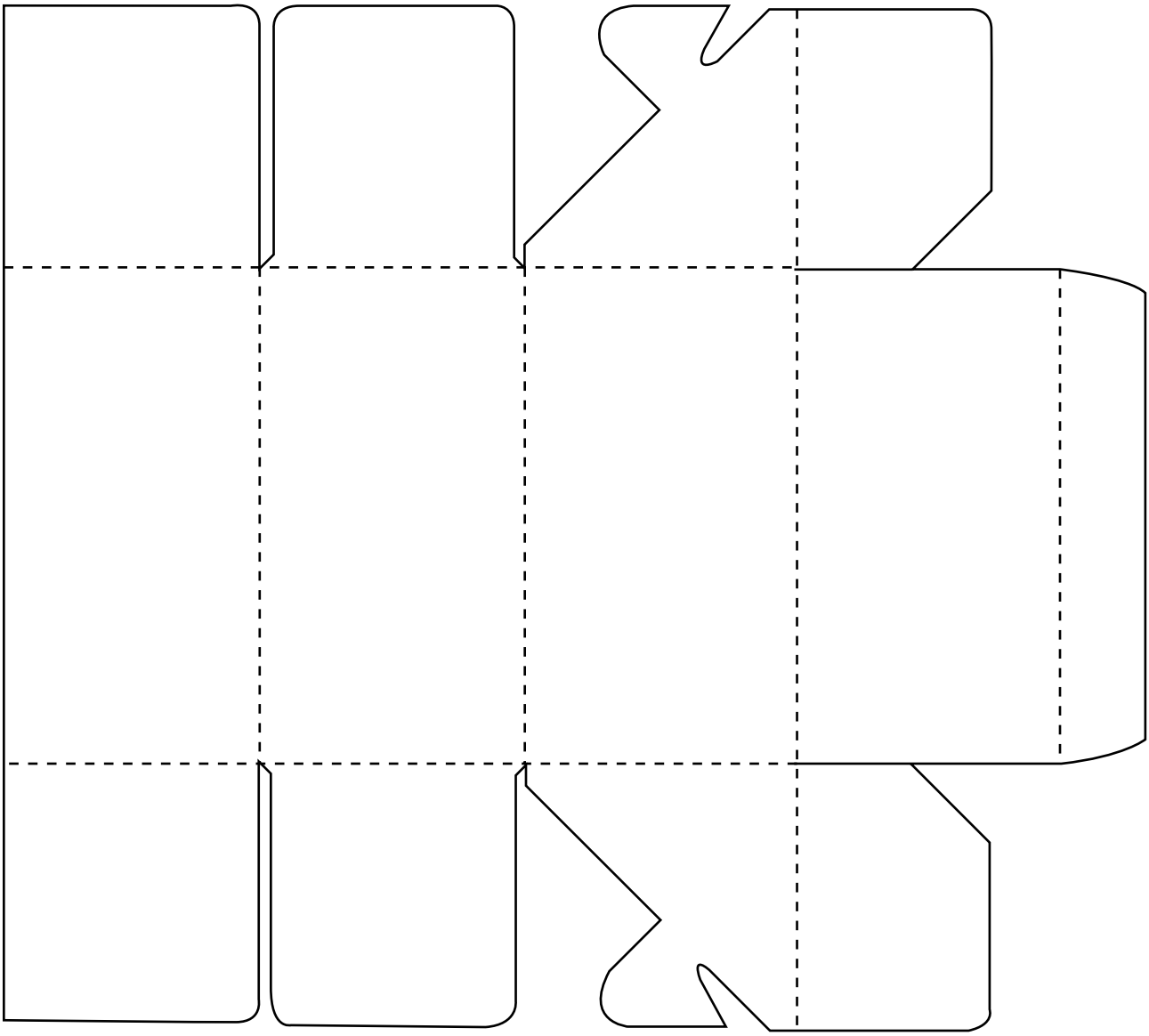
INFOLD AUTOMATIC BOTTOM

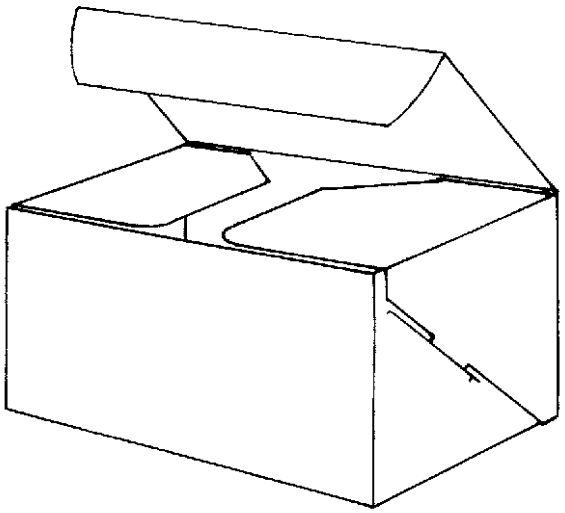




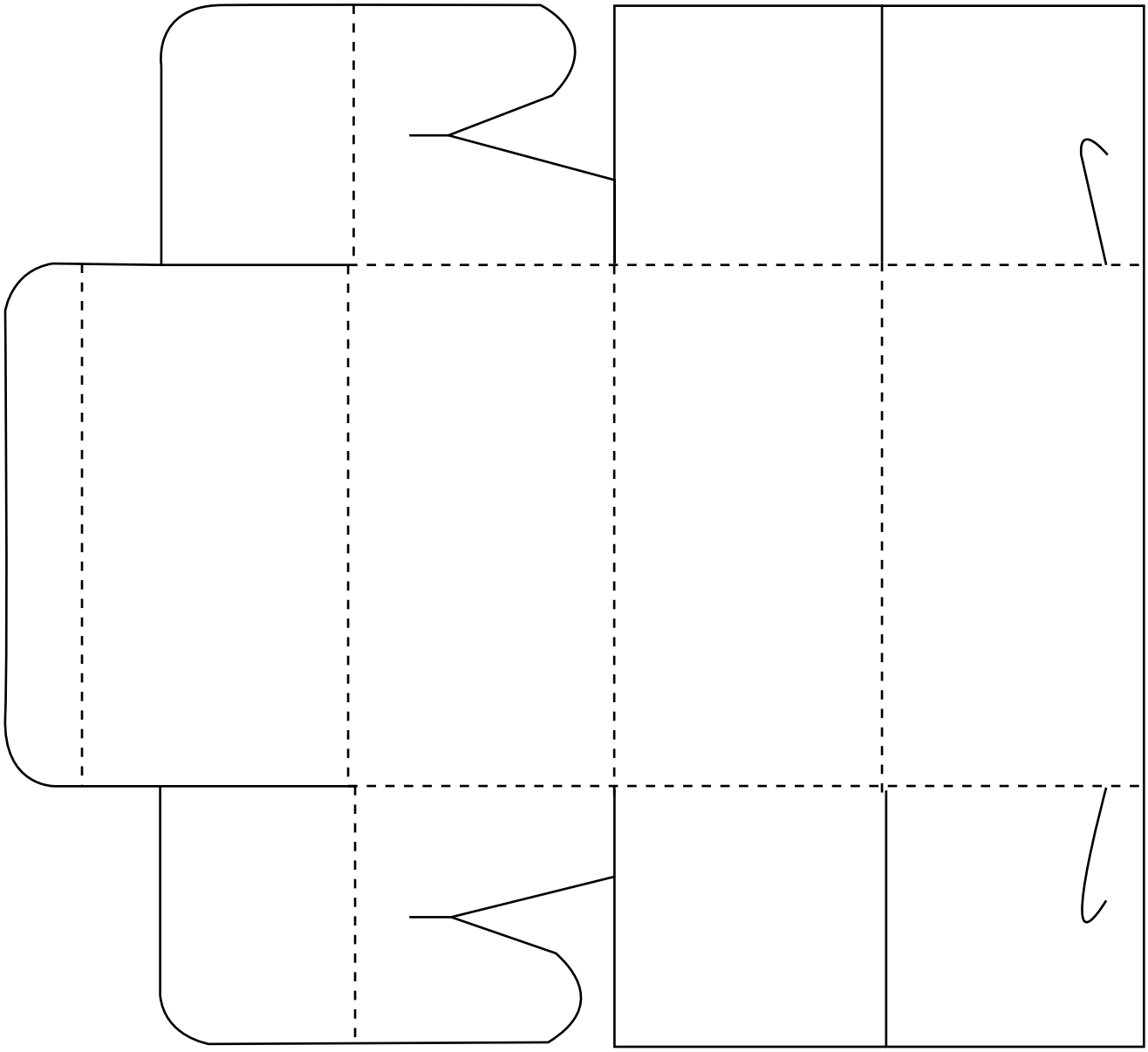


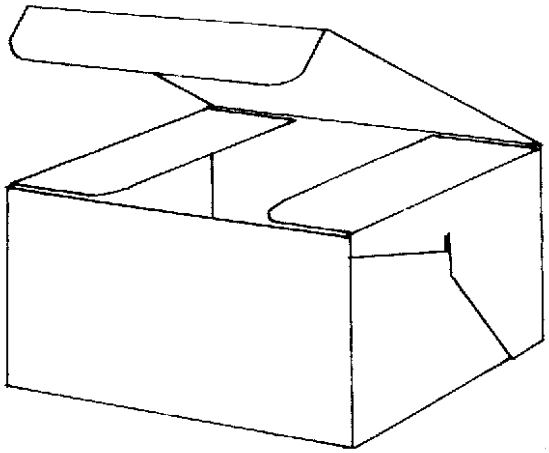




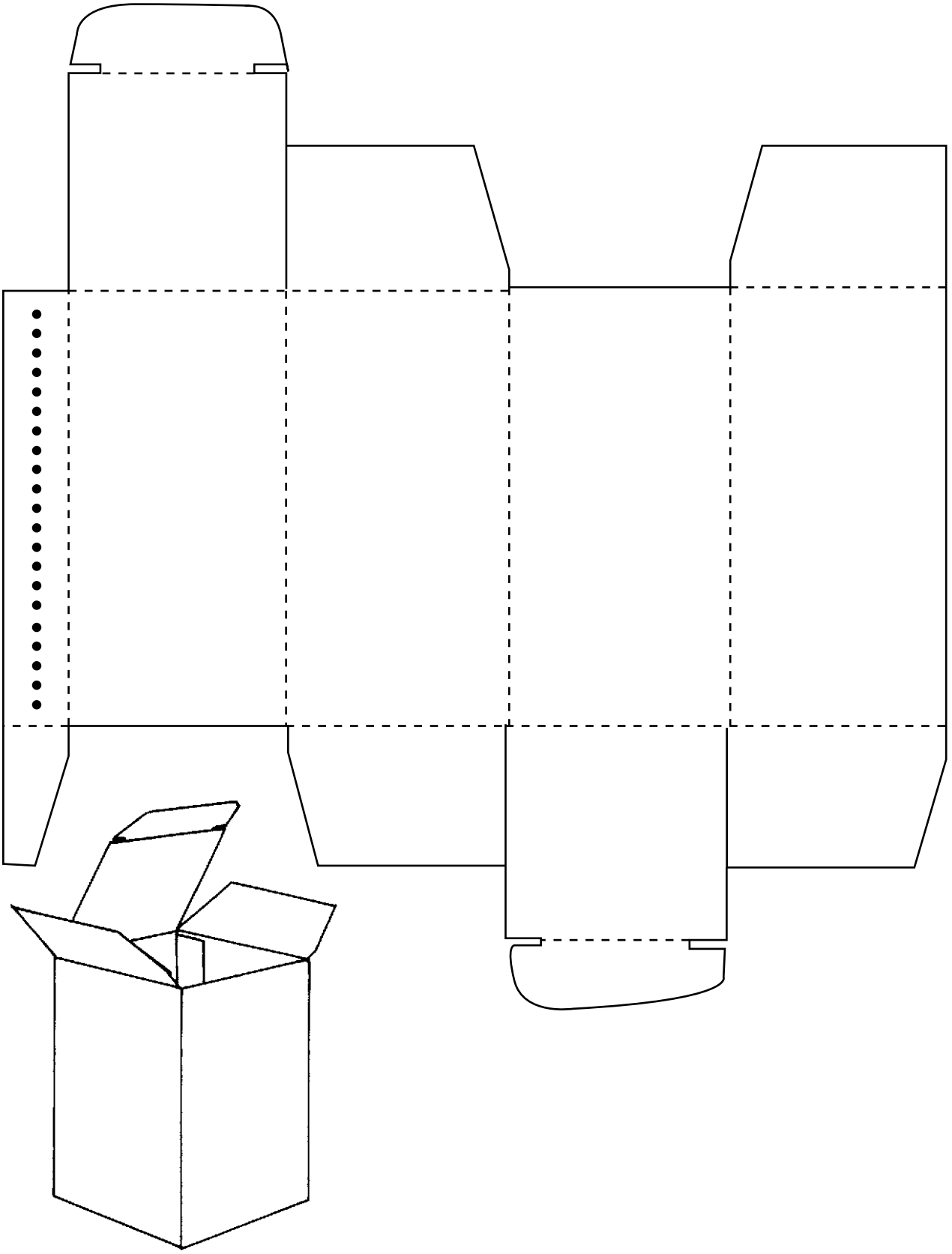


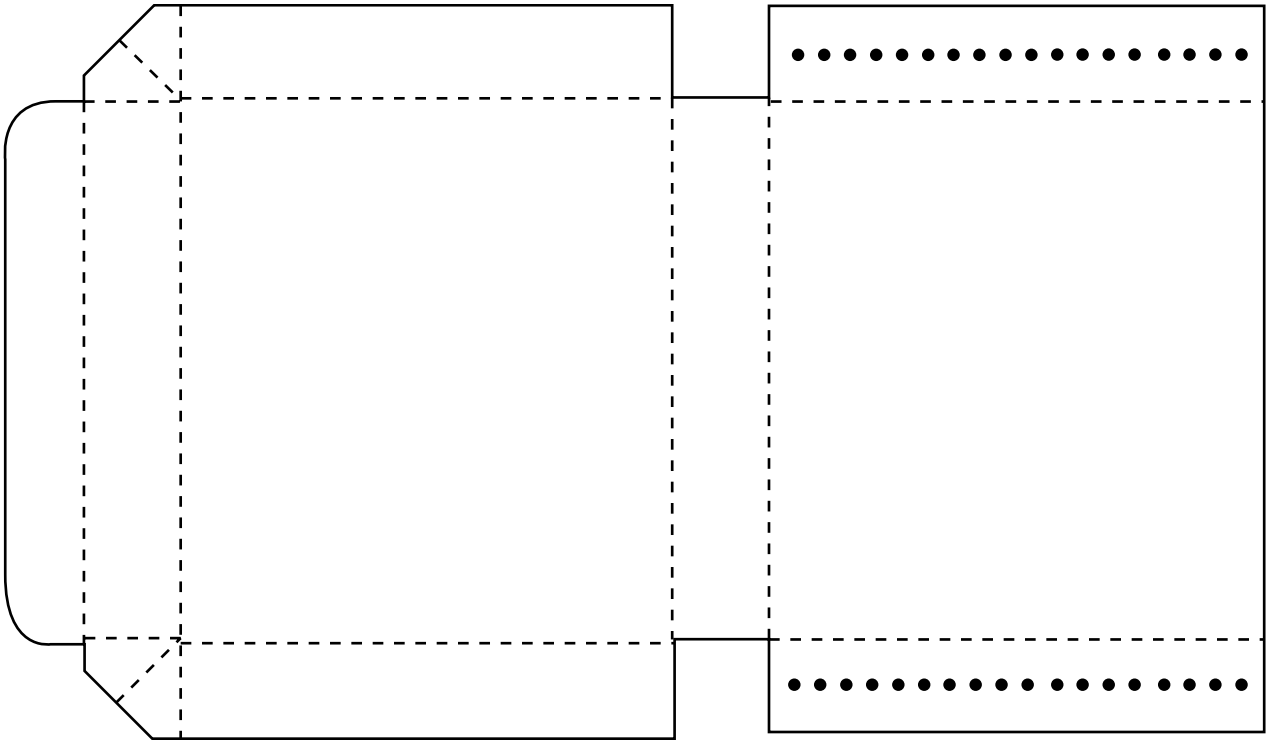
A typical butter carton

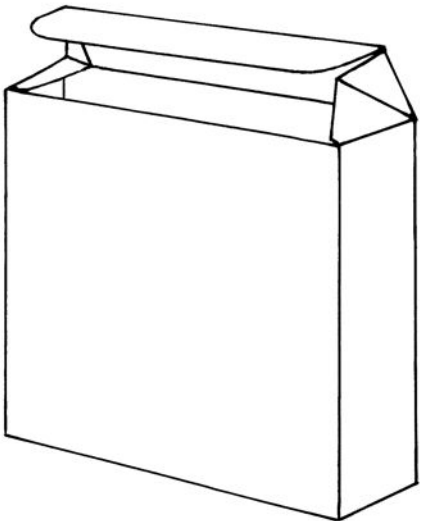




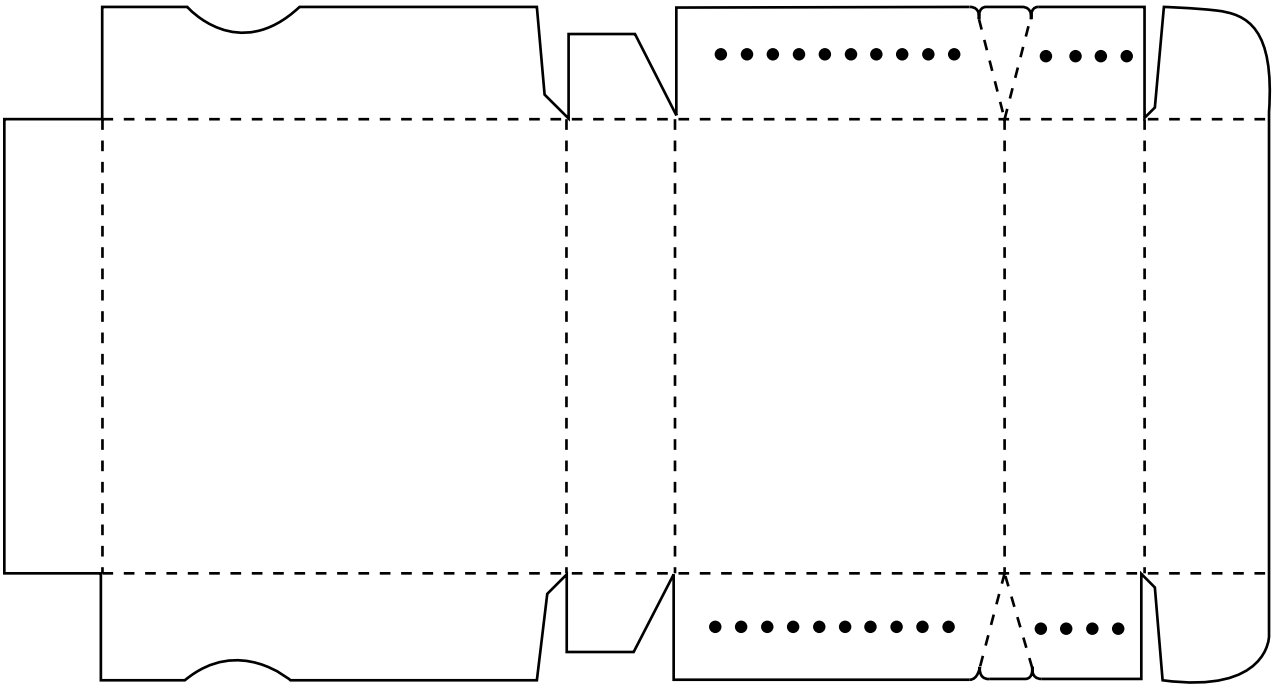
ELGIN-STYLE BUTTER WRAP

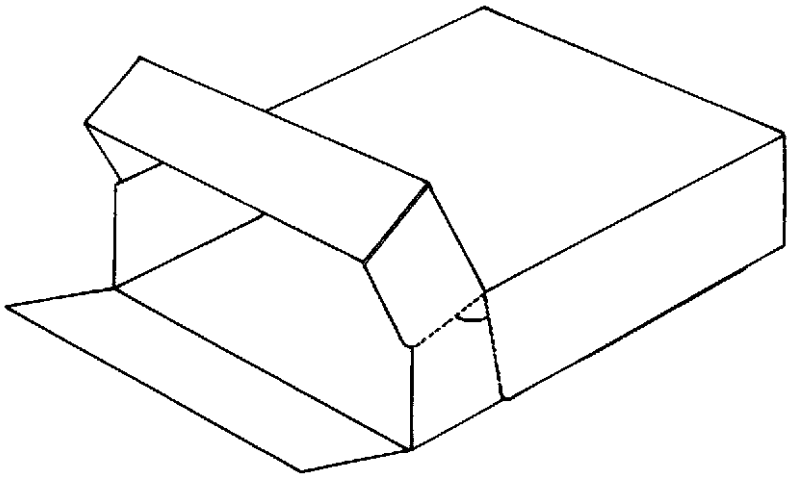


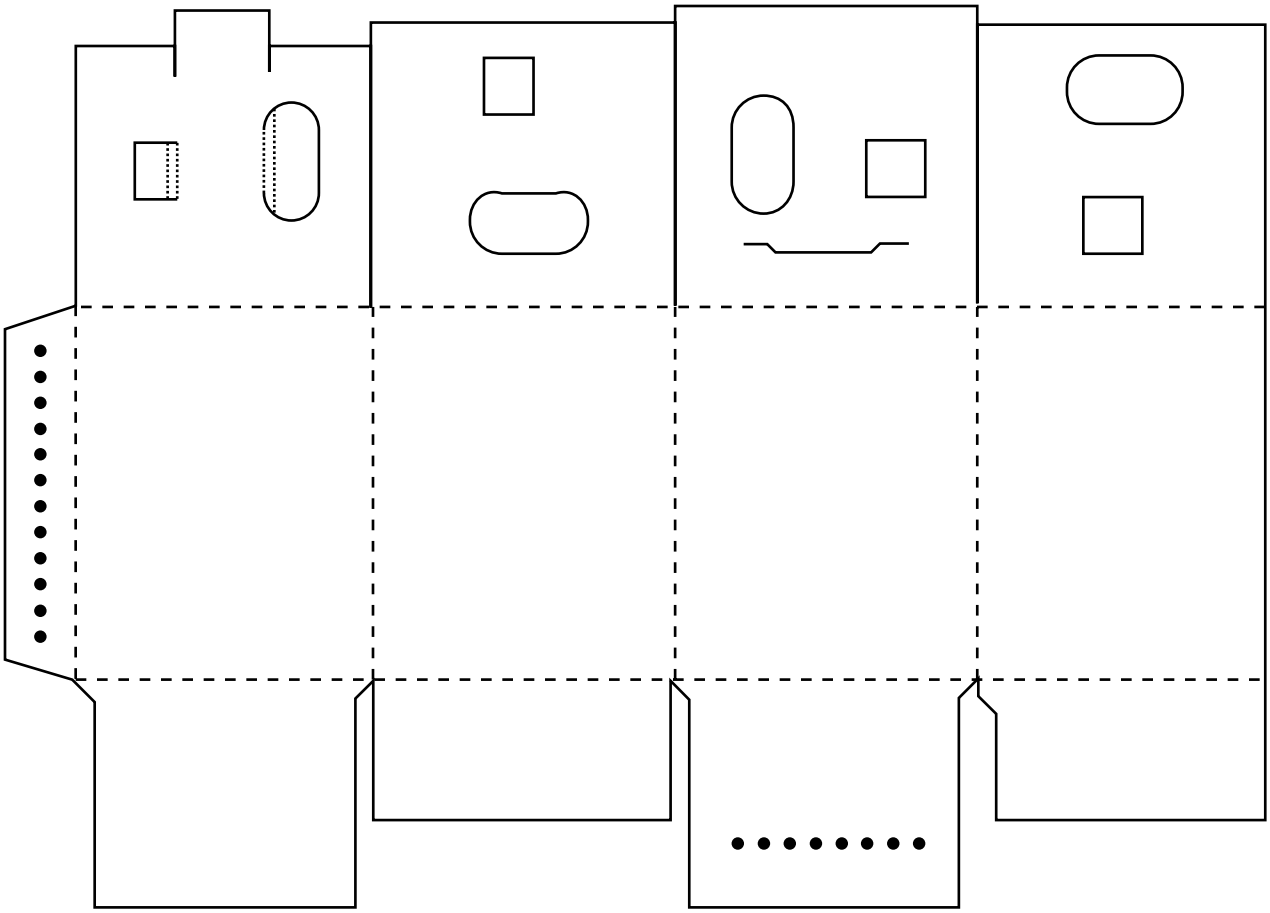




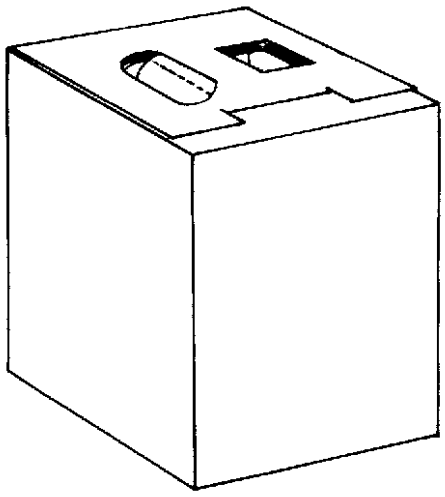
MARGARINE/BUTTER CARTON WITH TEAR-AWAY TABS



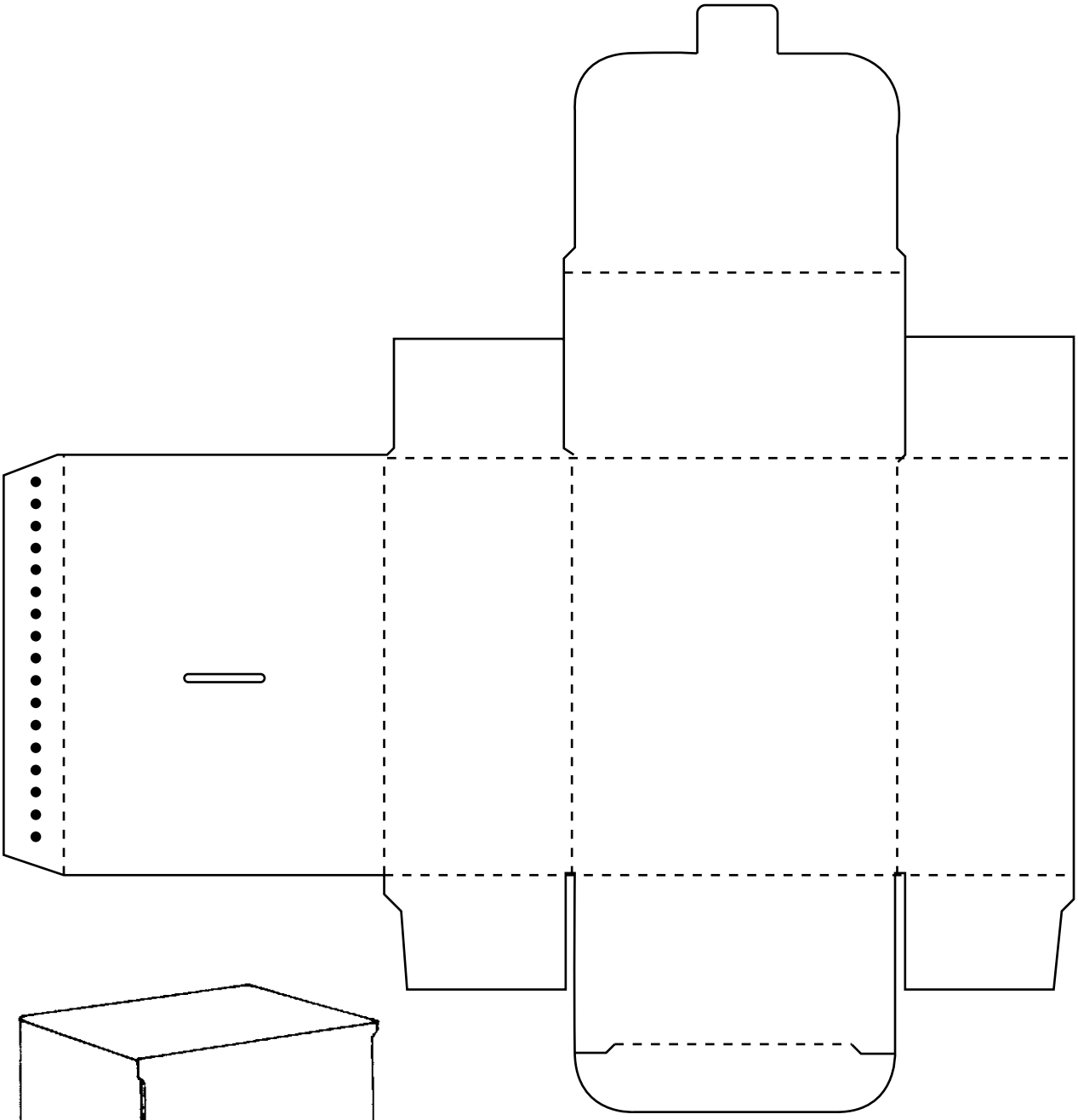


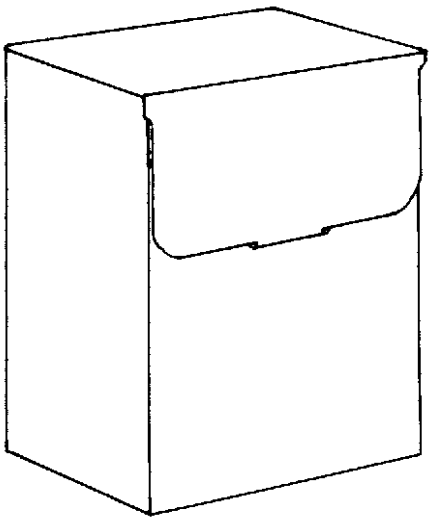


Especially useful for heavy loads

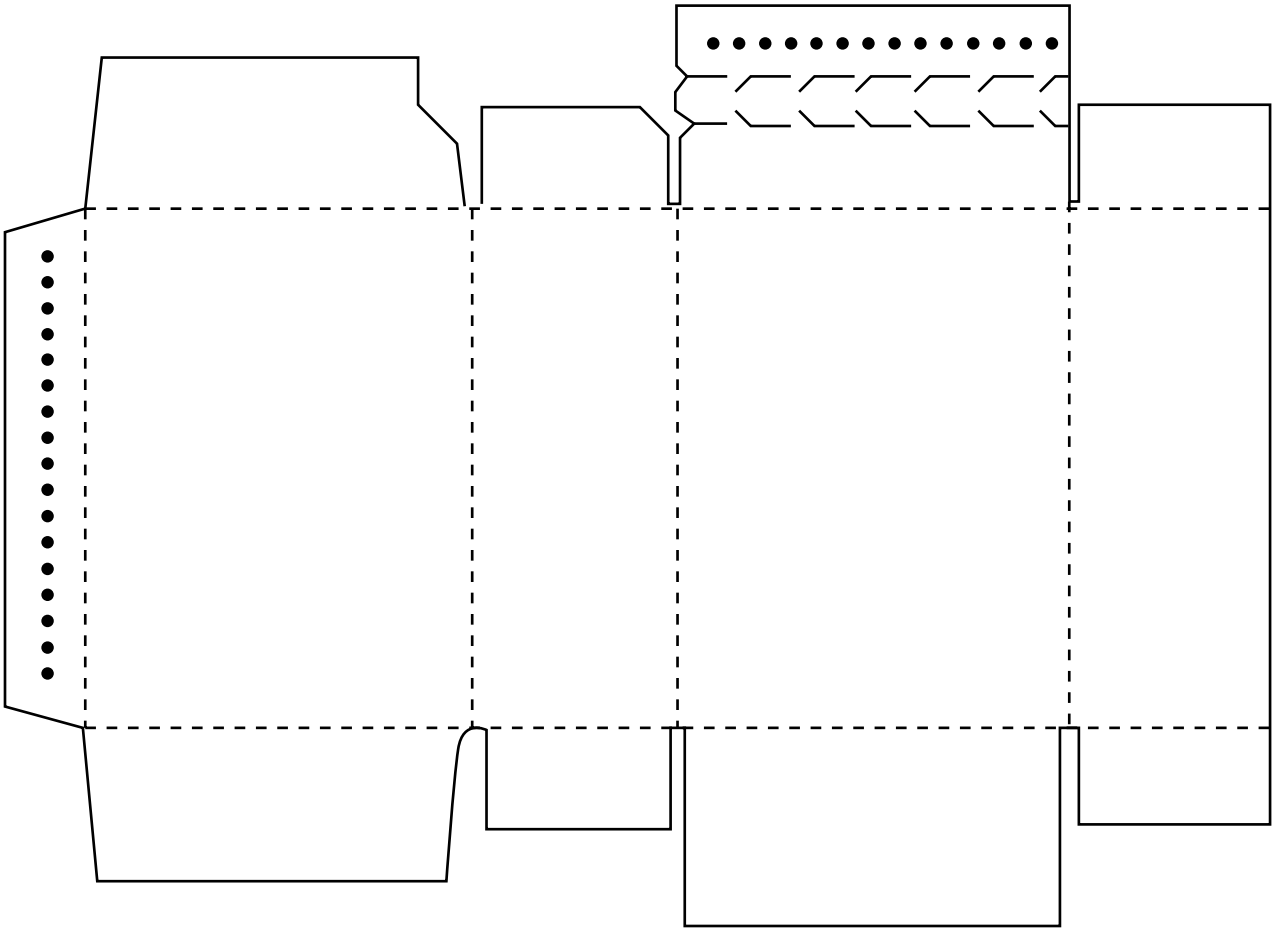


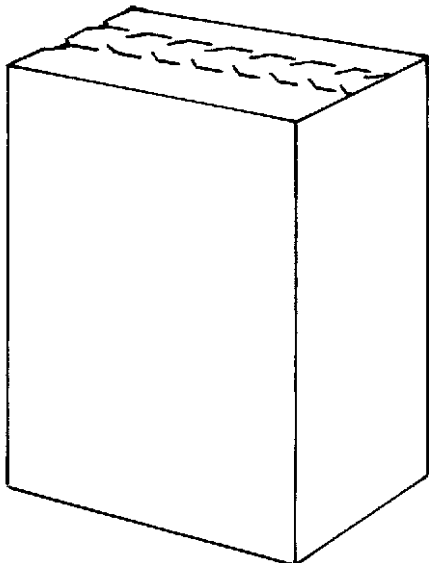
STRAIGHT TUCK WITH EXTENDED TOP PANEL



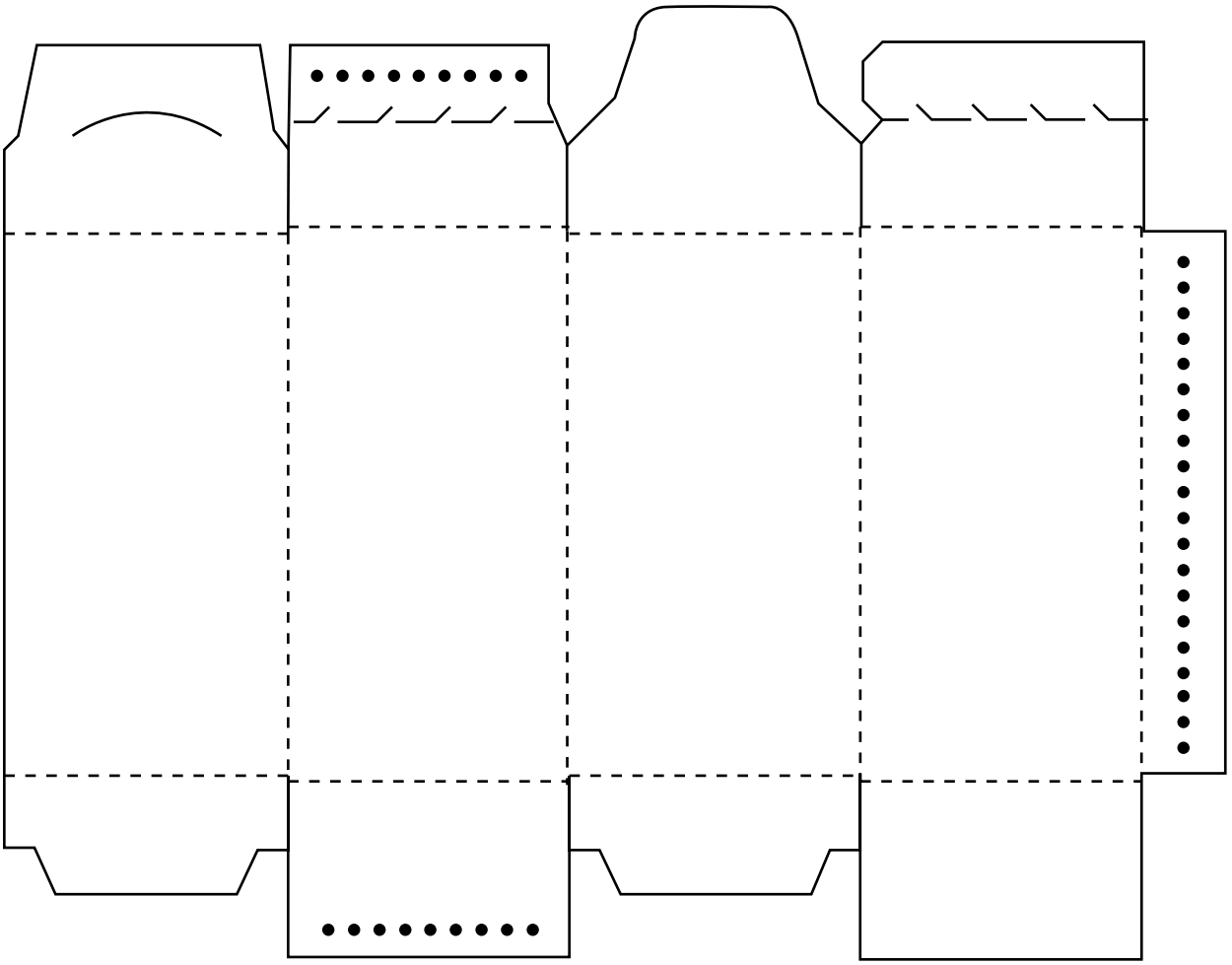


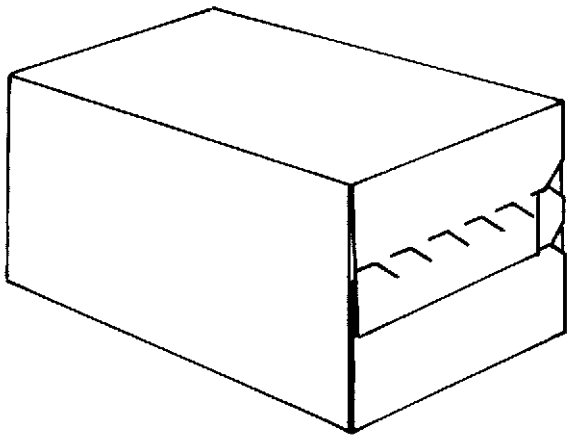
SEAL END WITH ZIPPER

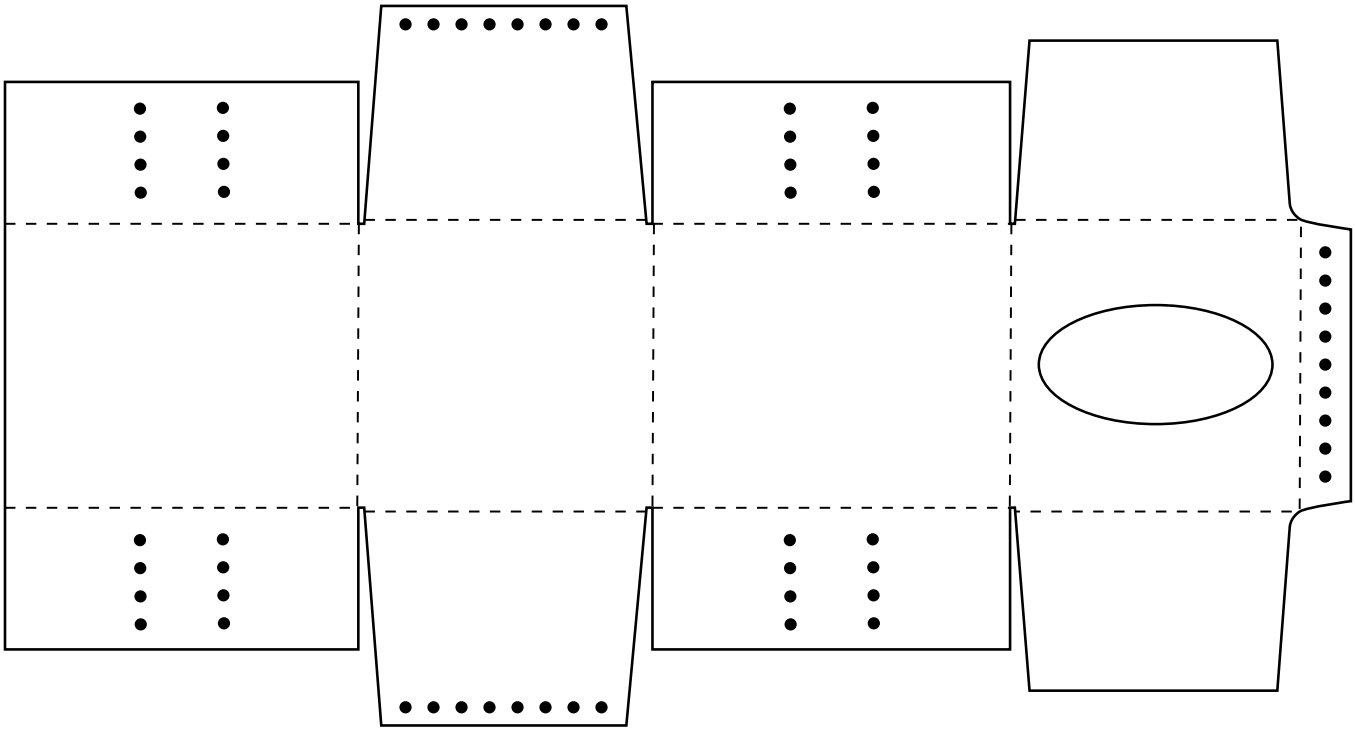


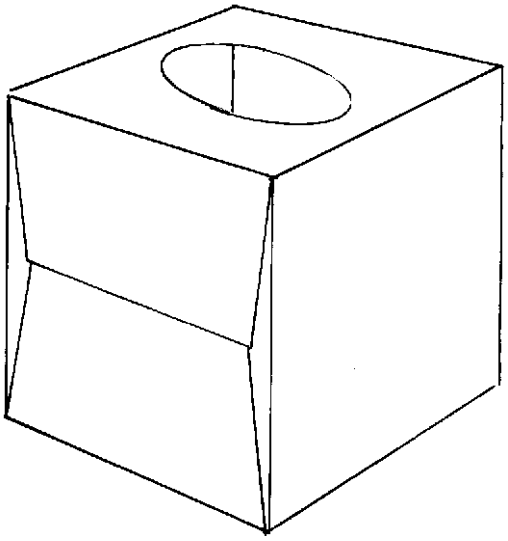


SEAL END WITH LOCK TAB AND ZIPPER

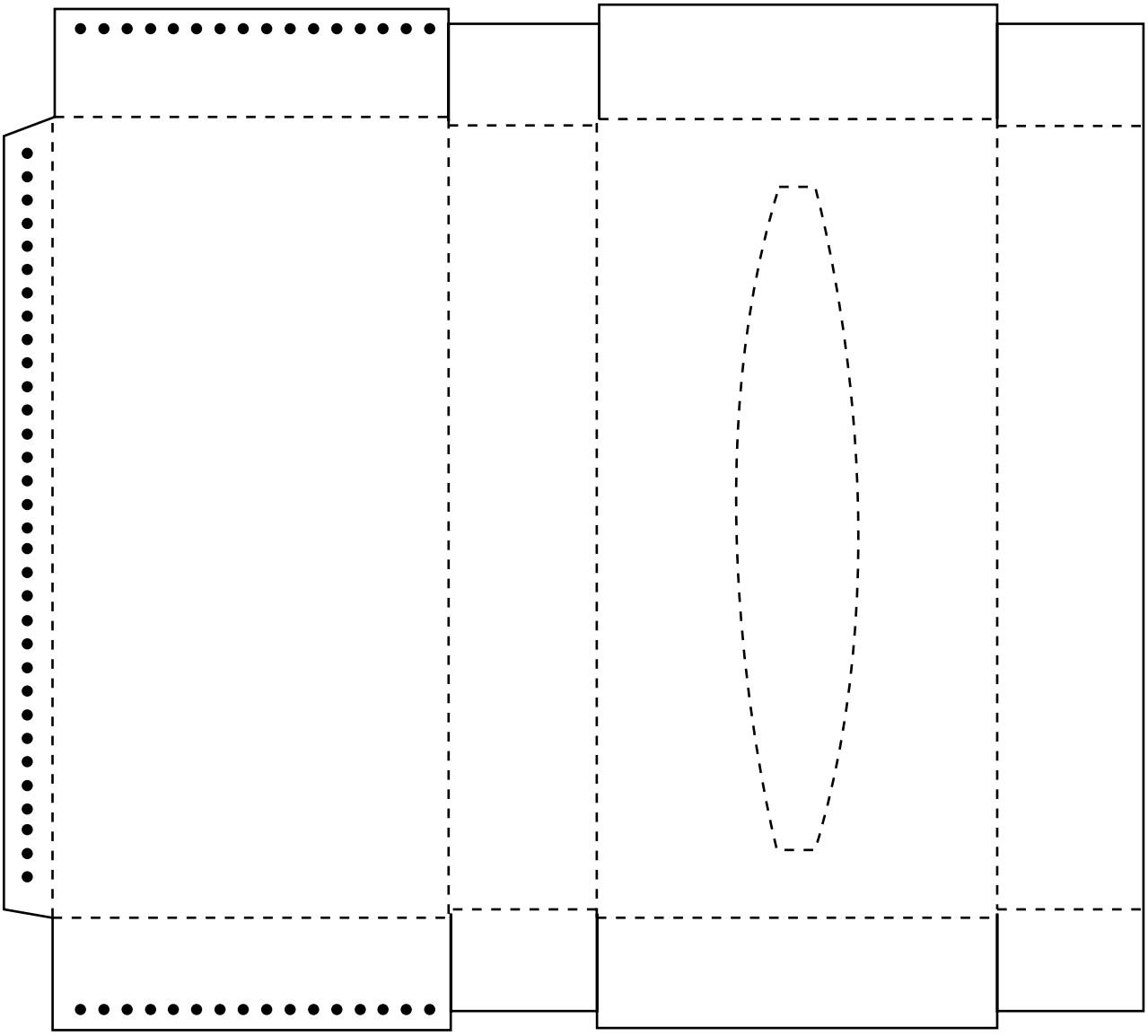


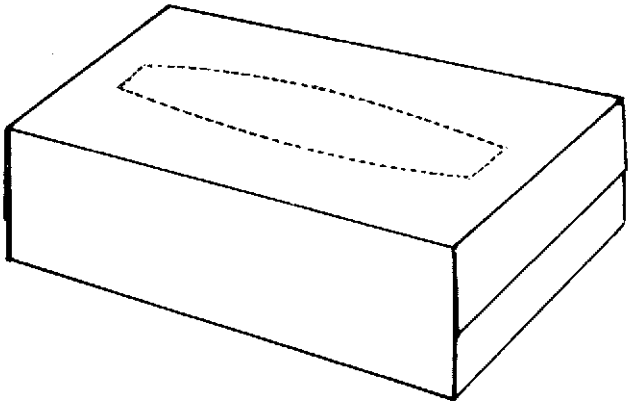






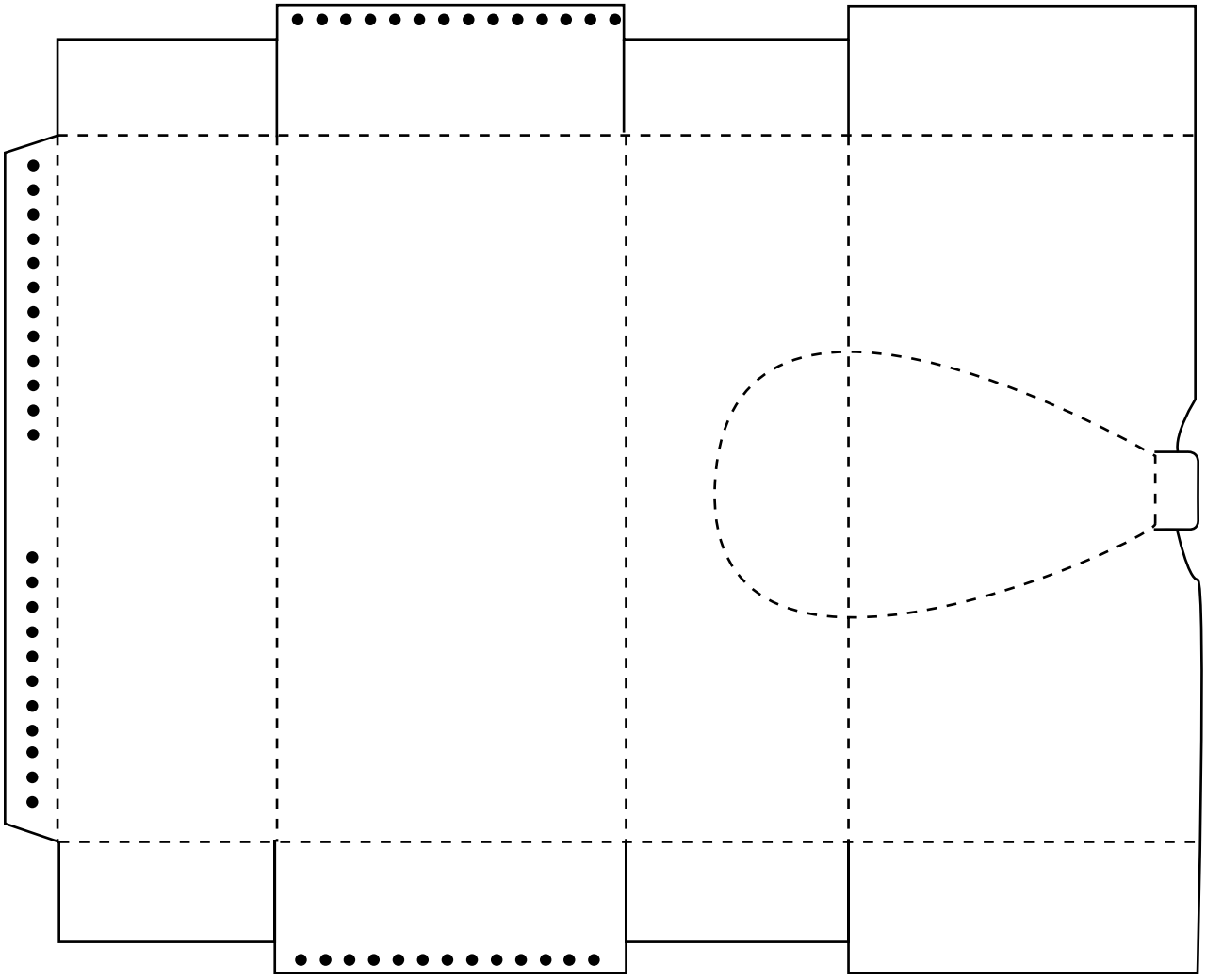
PARTIAL OVERLAP SEAL END WITH PERFORATED TOP

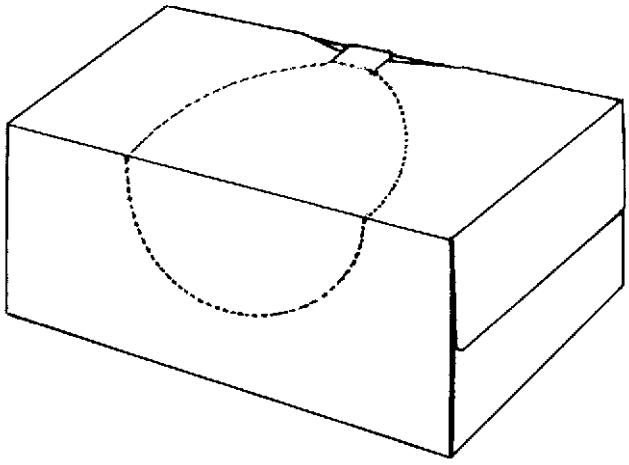




A tissue dispenser

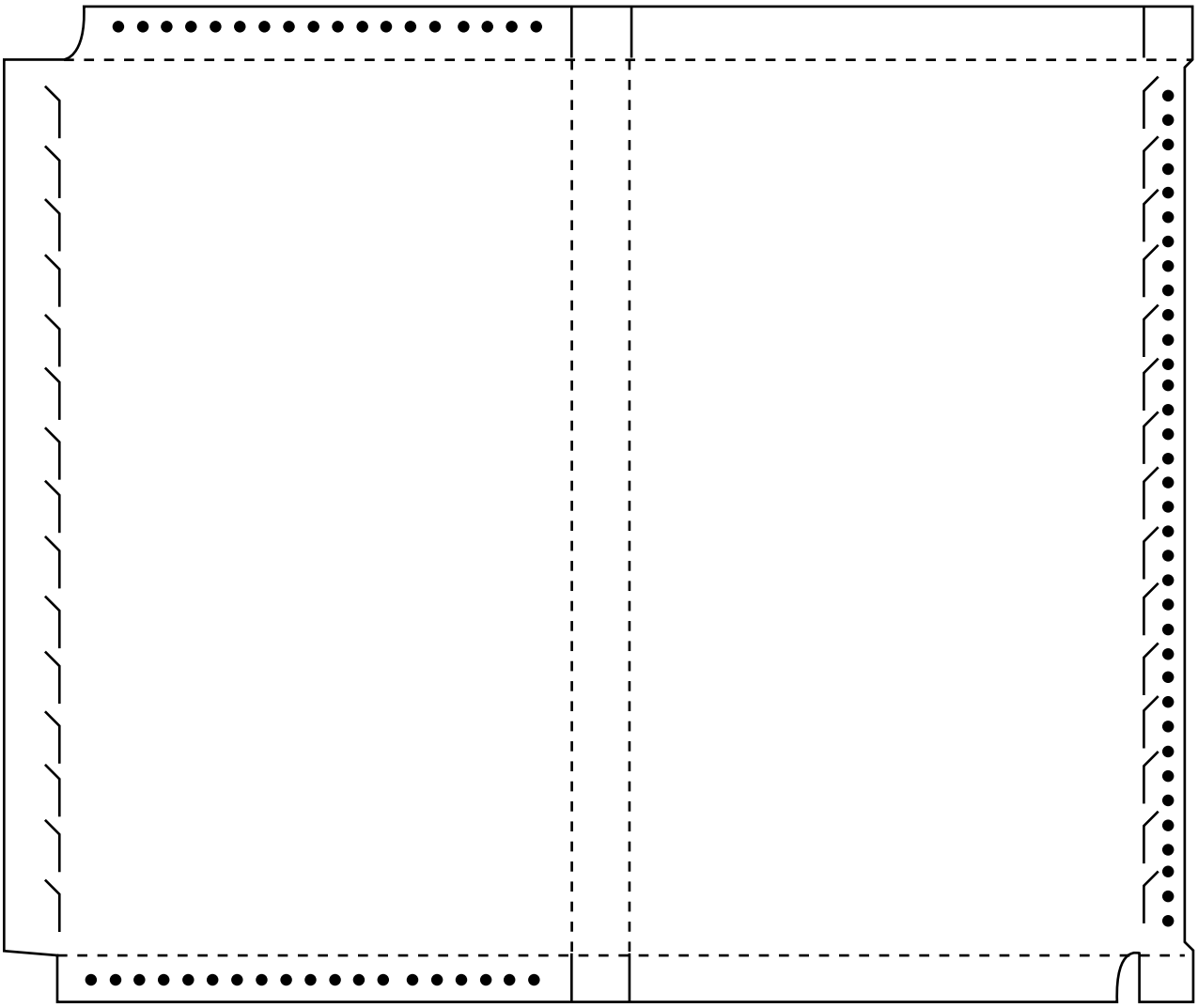
PARTIAL OVERLAP SEAL END WITH PERFORATED TOP AND FRONT PANEL

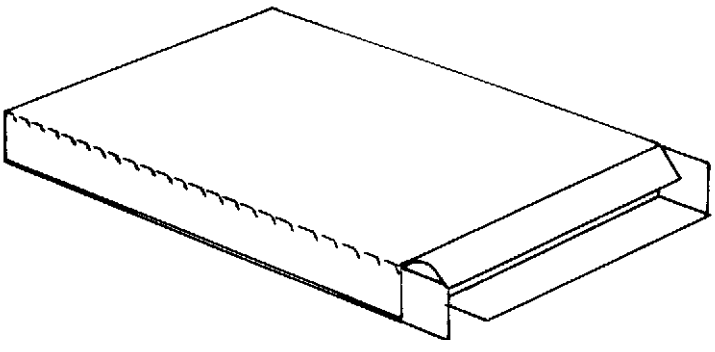


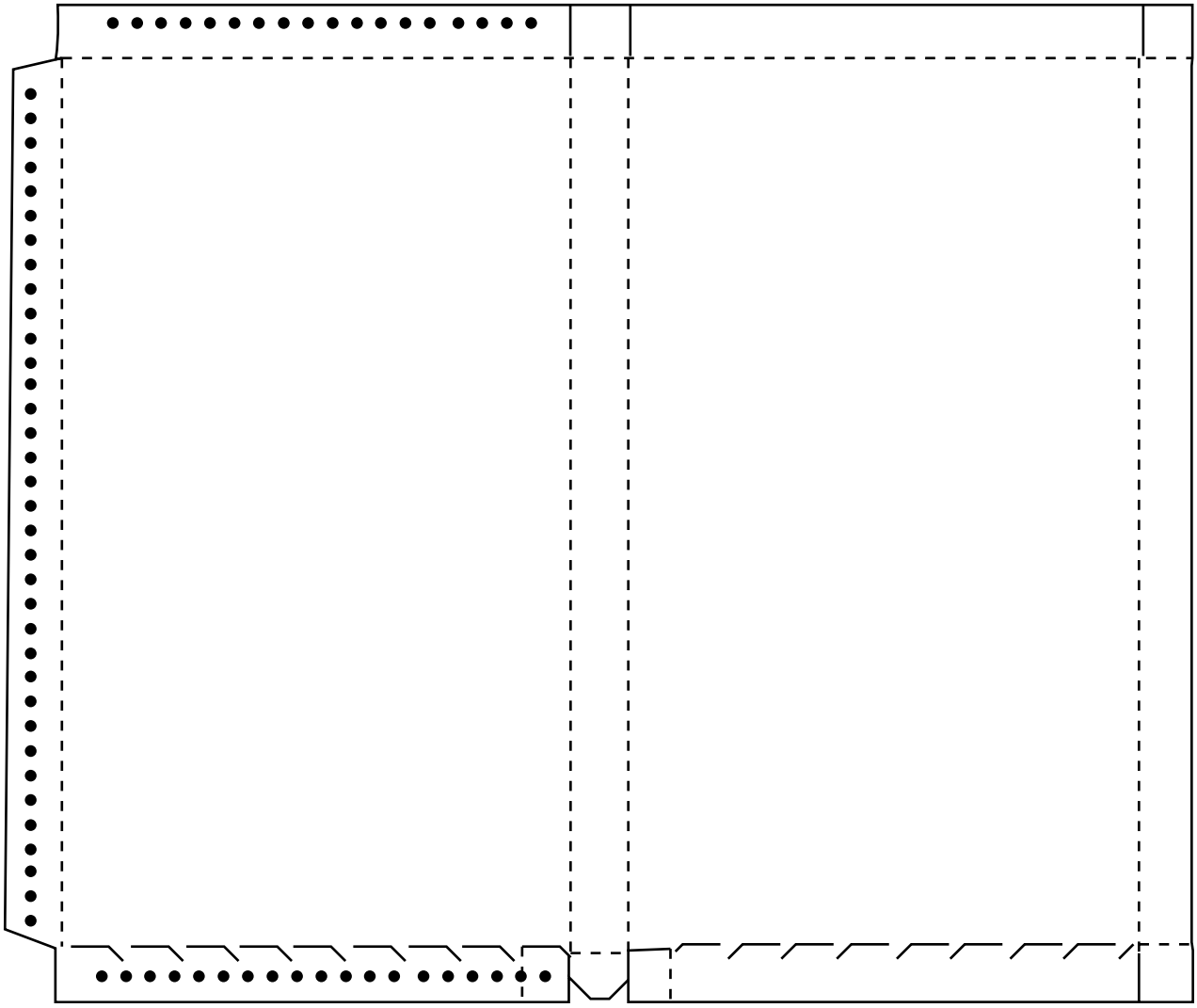


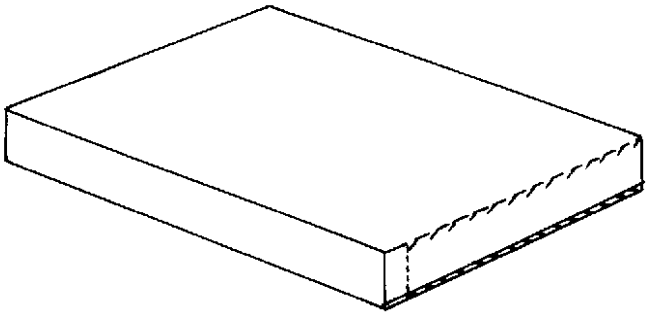
A tissue dispenser.

ELL-STRIP BACON PACK

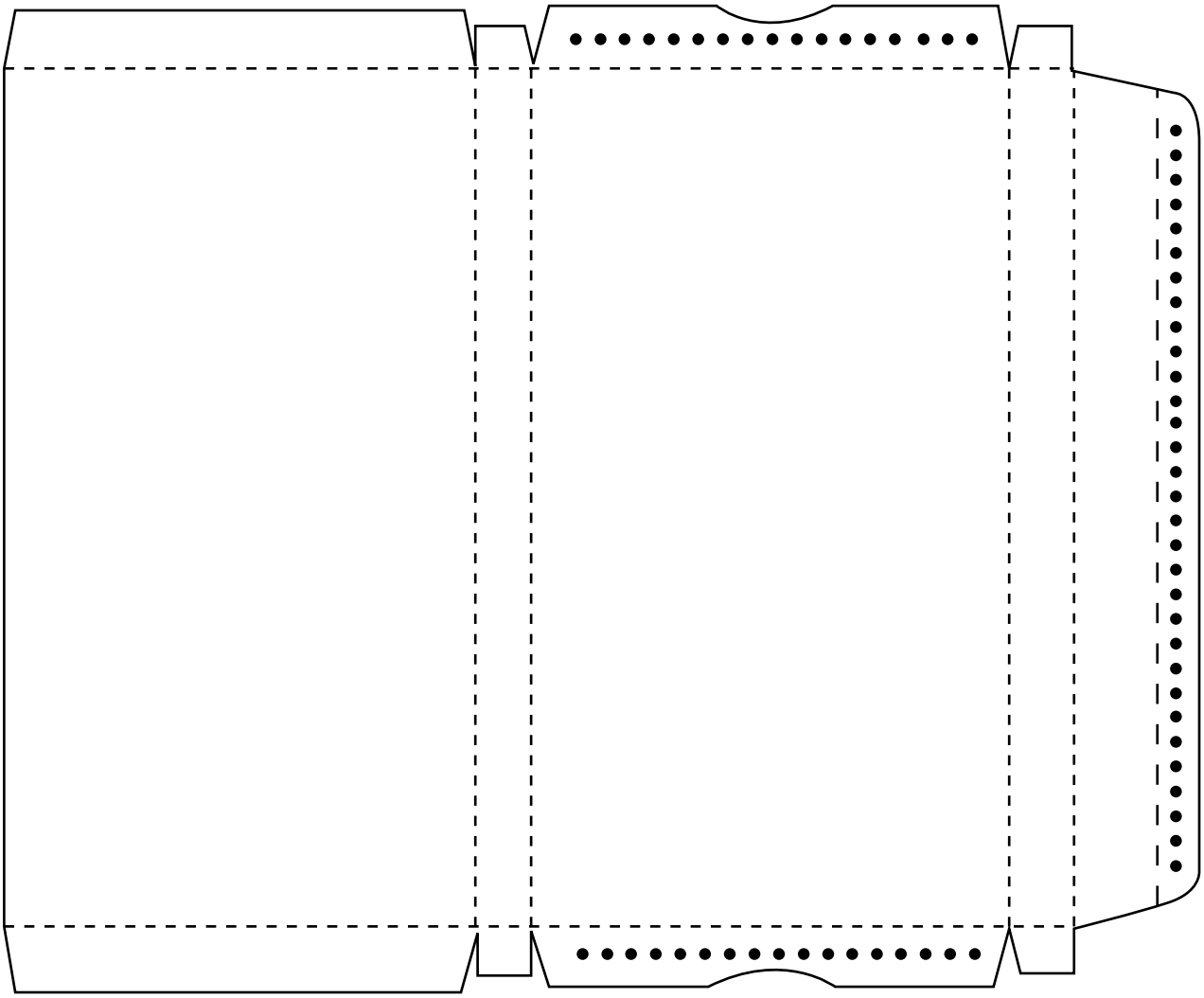


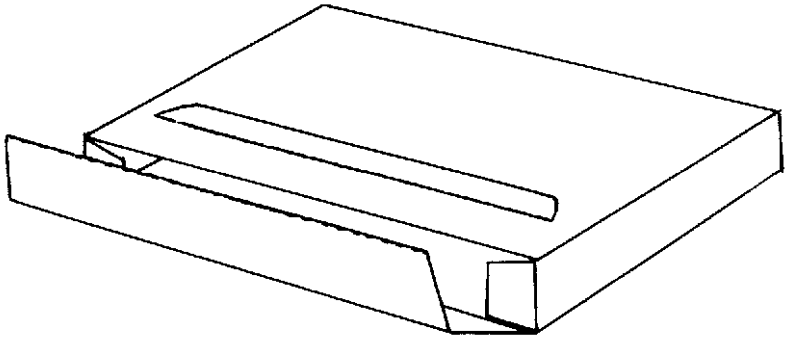


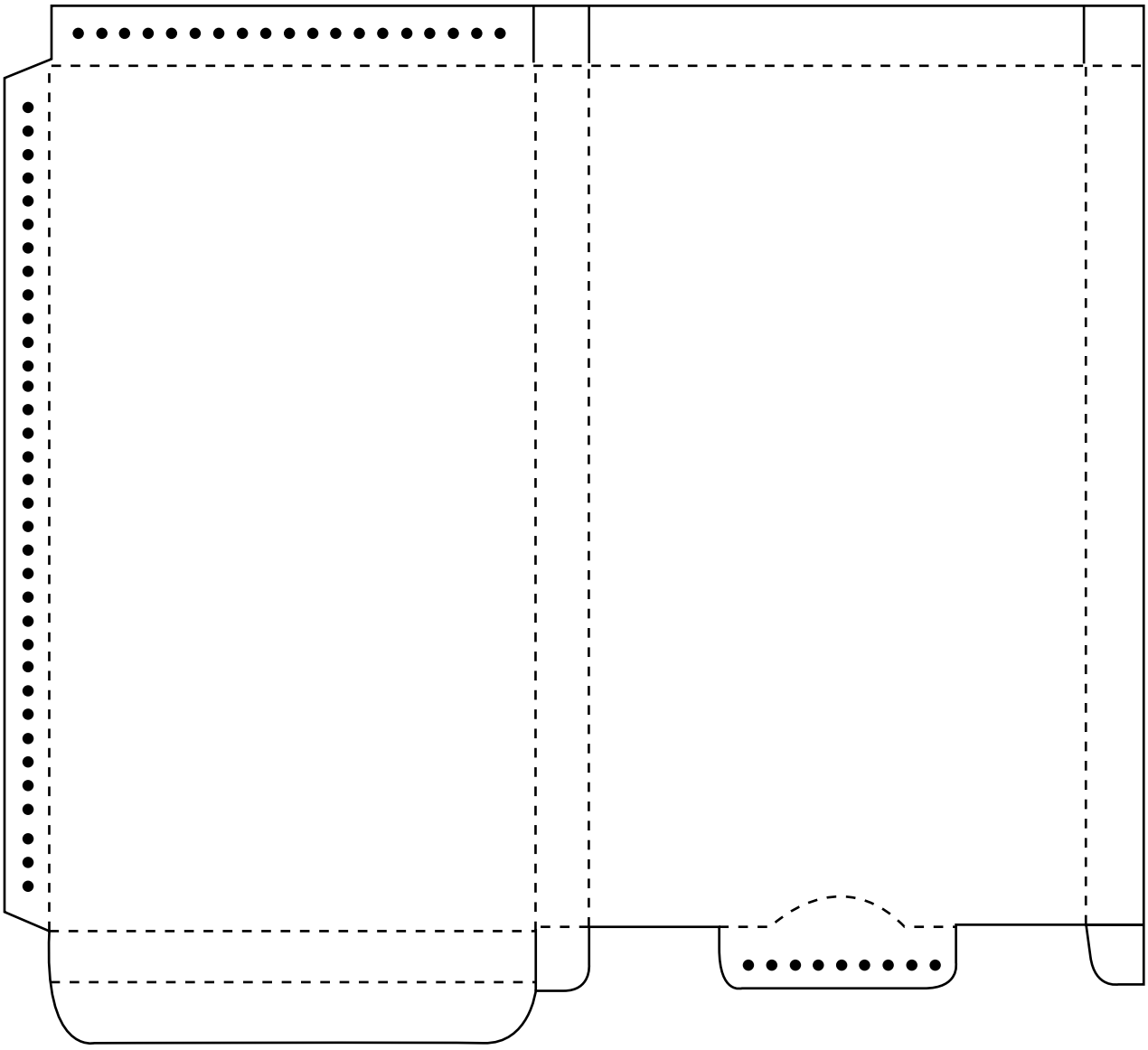


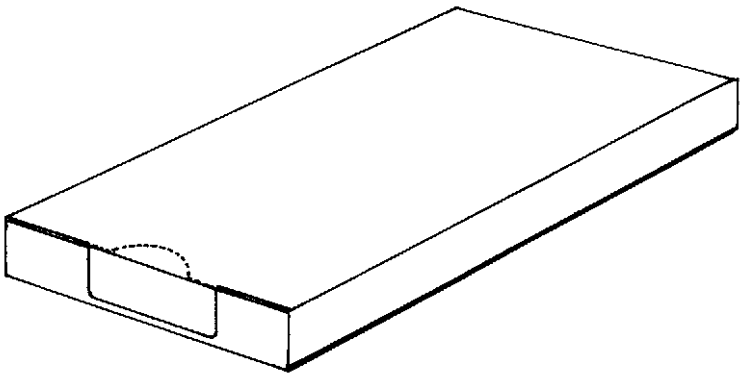


TOP-SEAL BACON PACK

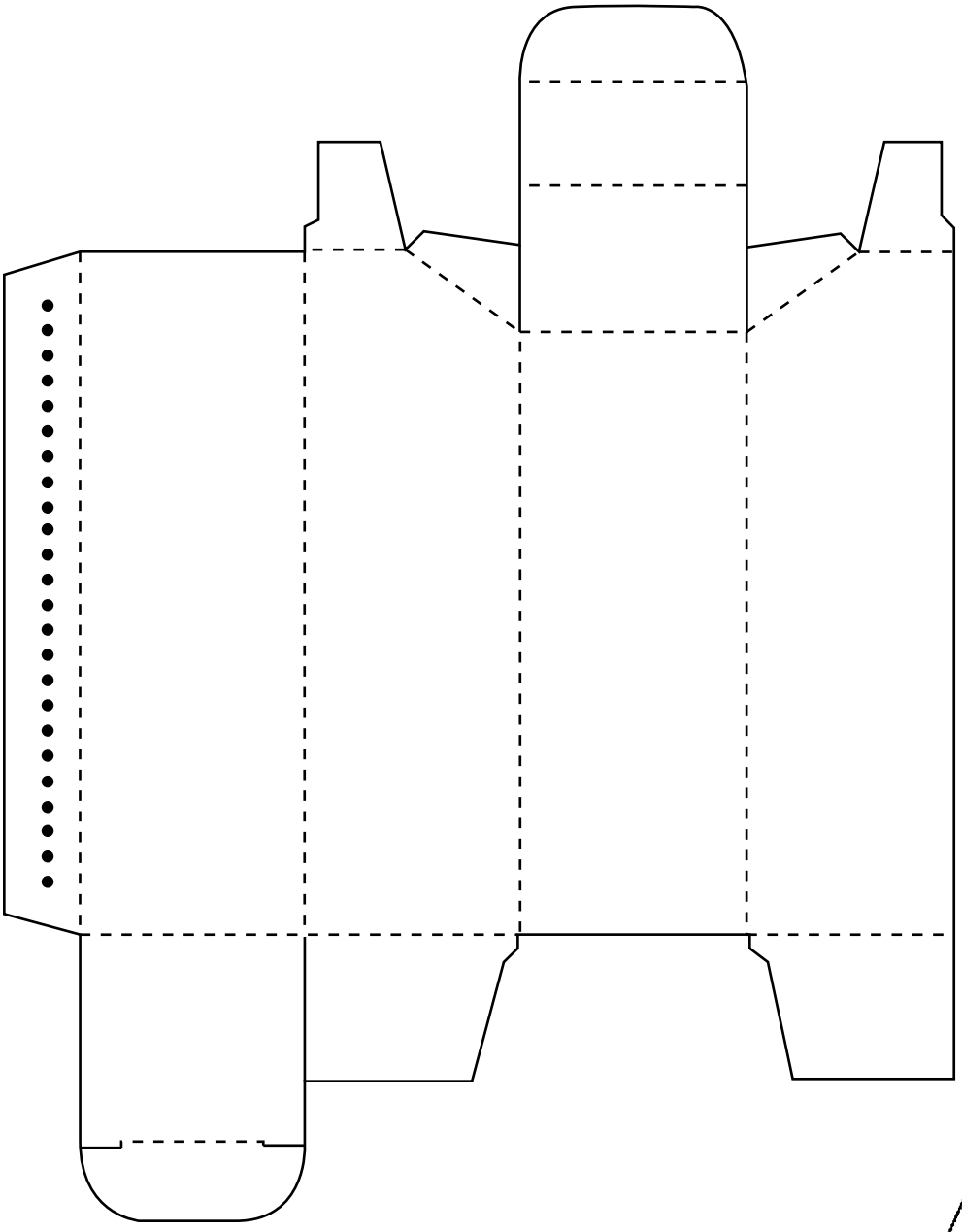


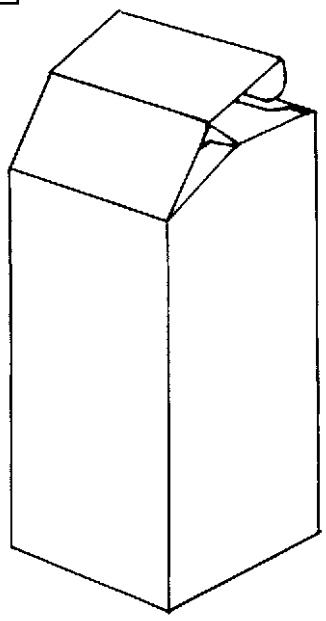




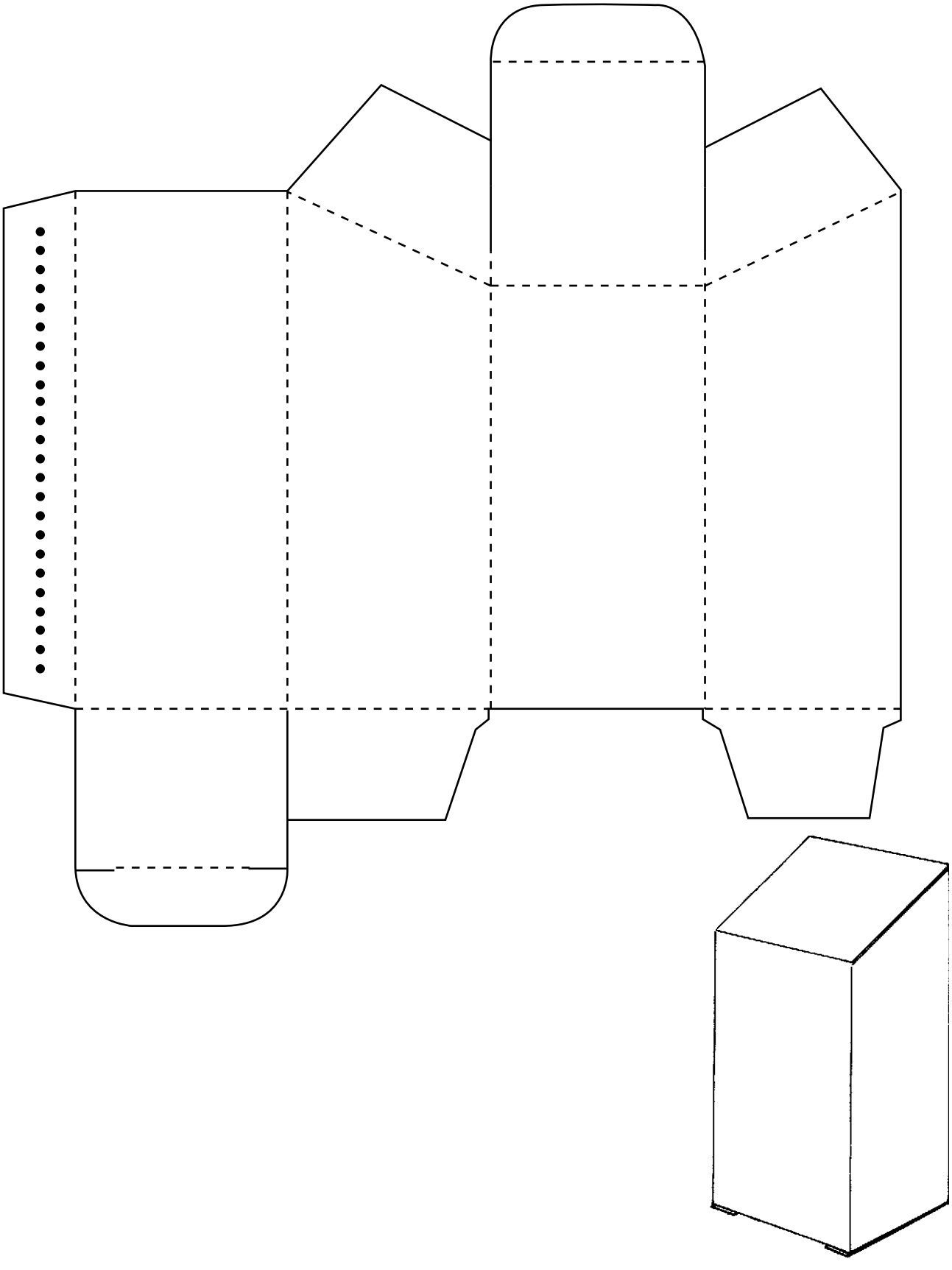


REVERSE TUCK WITH FACETED TOP

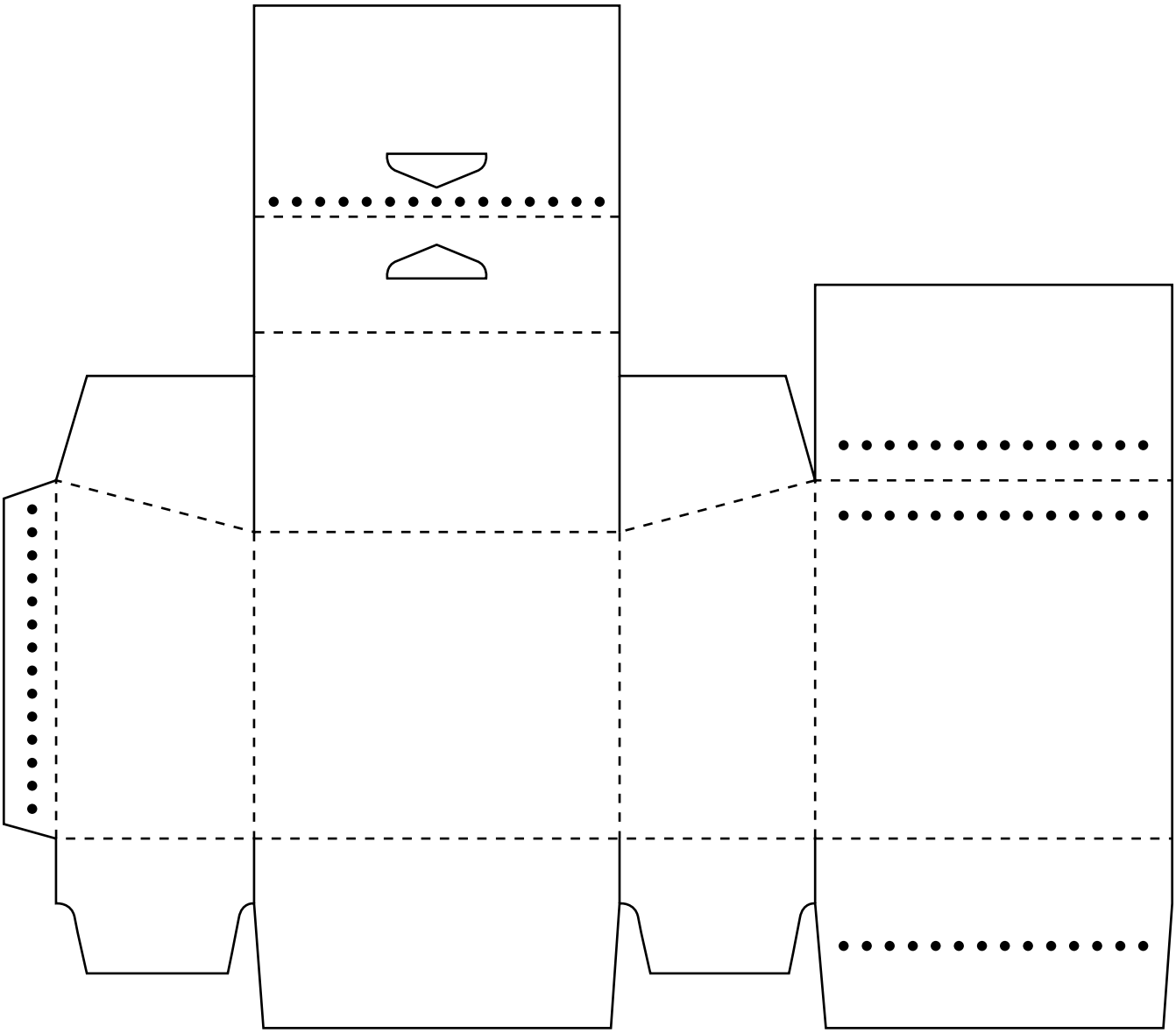


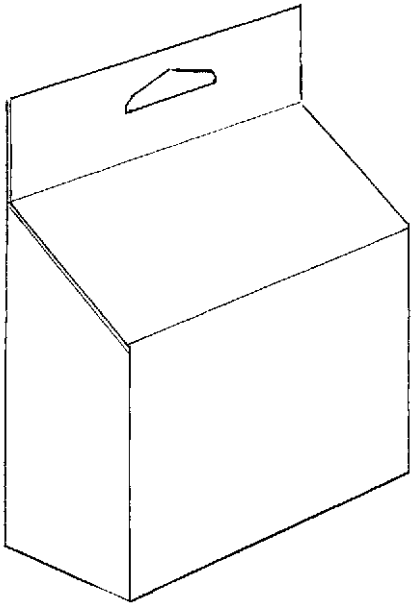


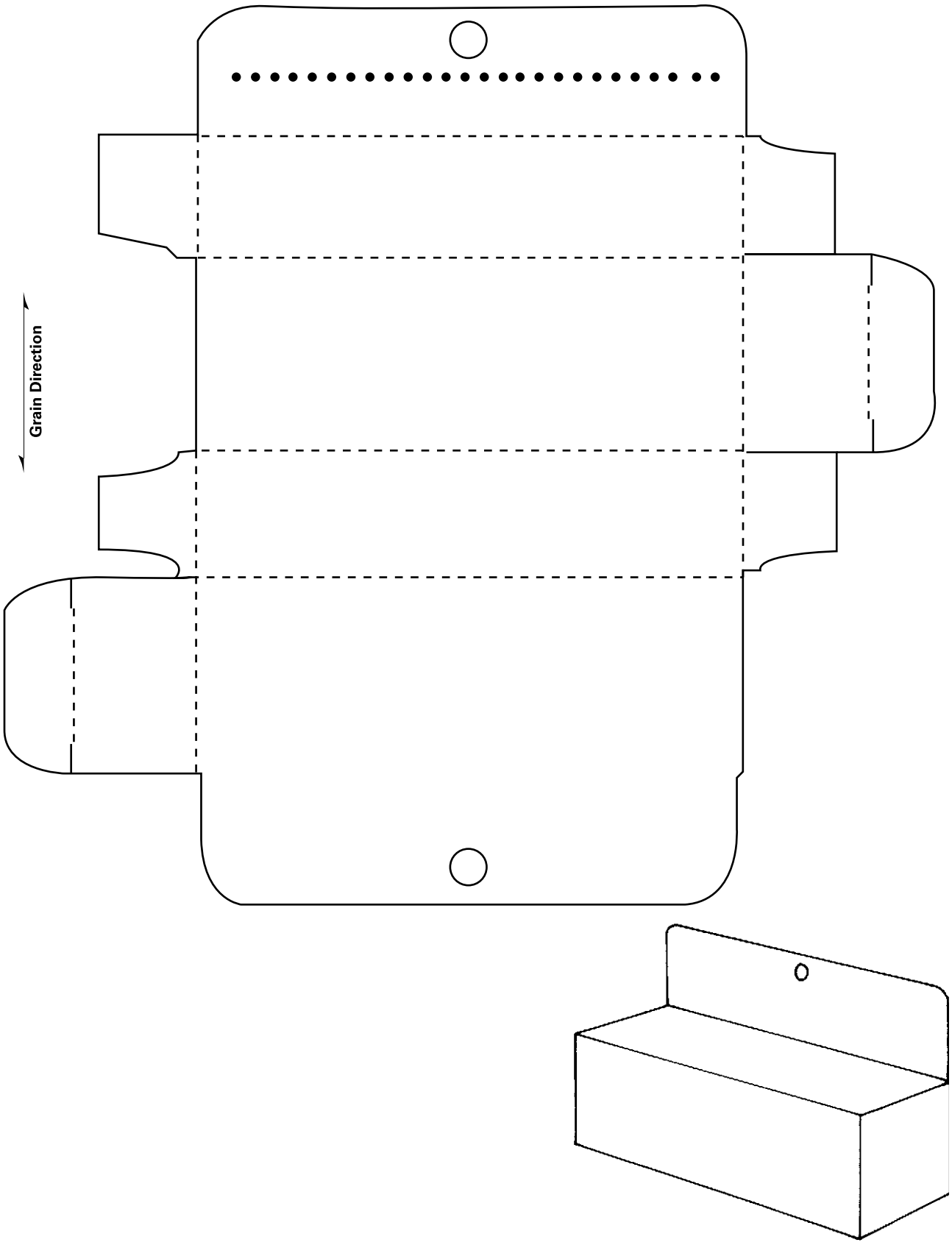
REVERSE TUCK WITH TAPERED TOP



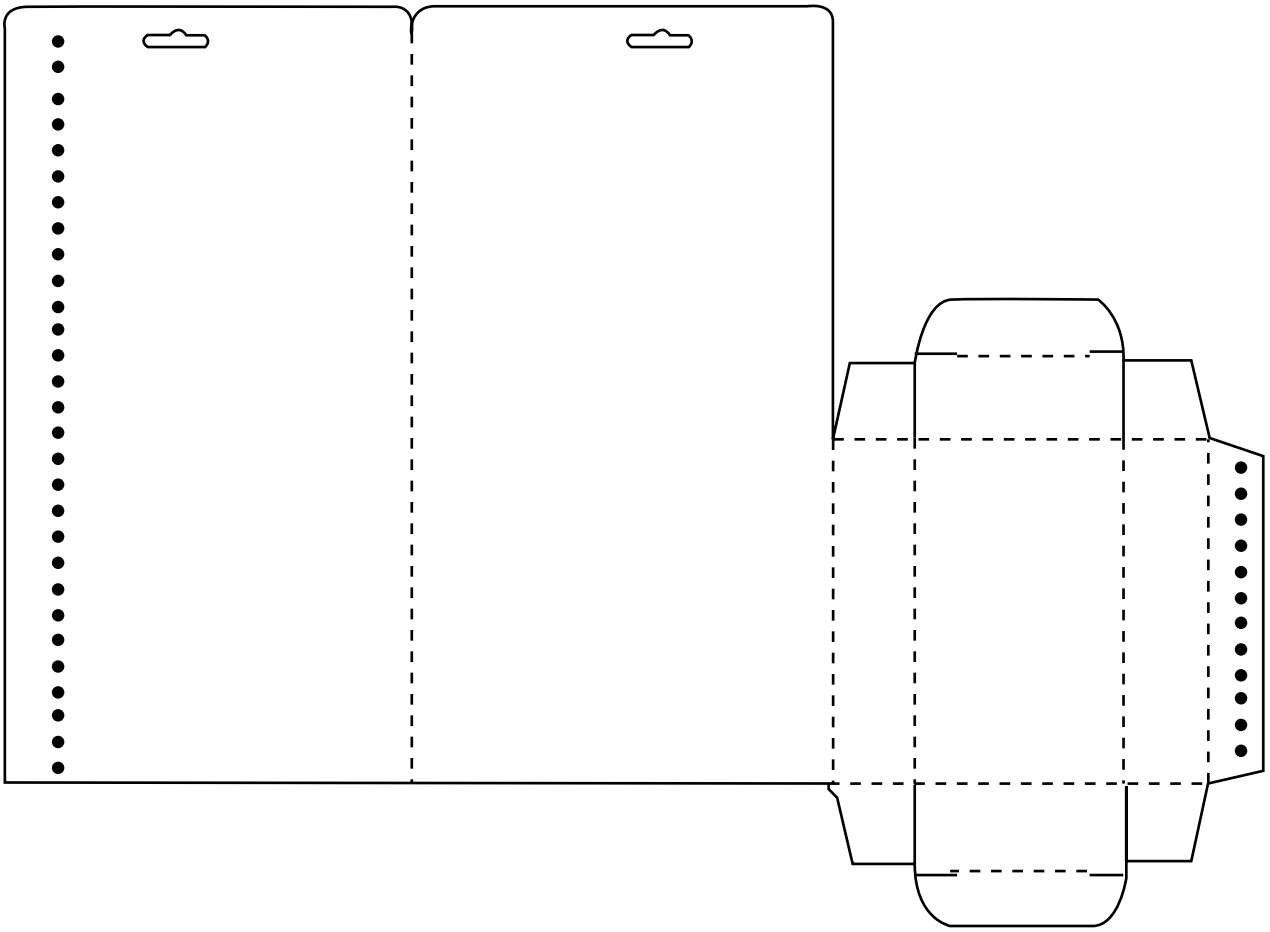
SLANTED TOP WITH HANG TAG

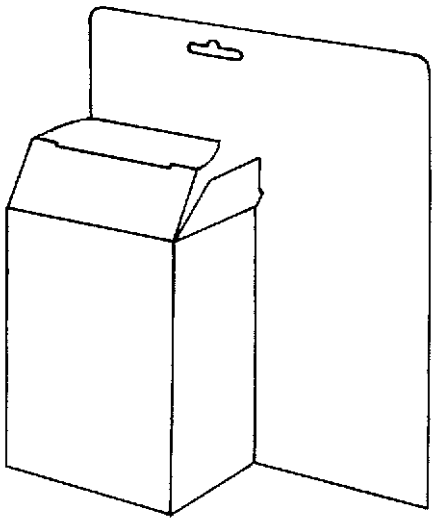


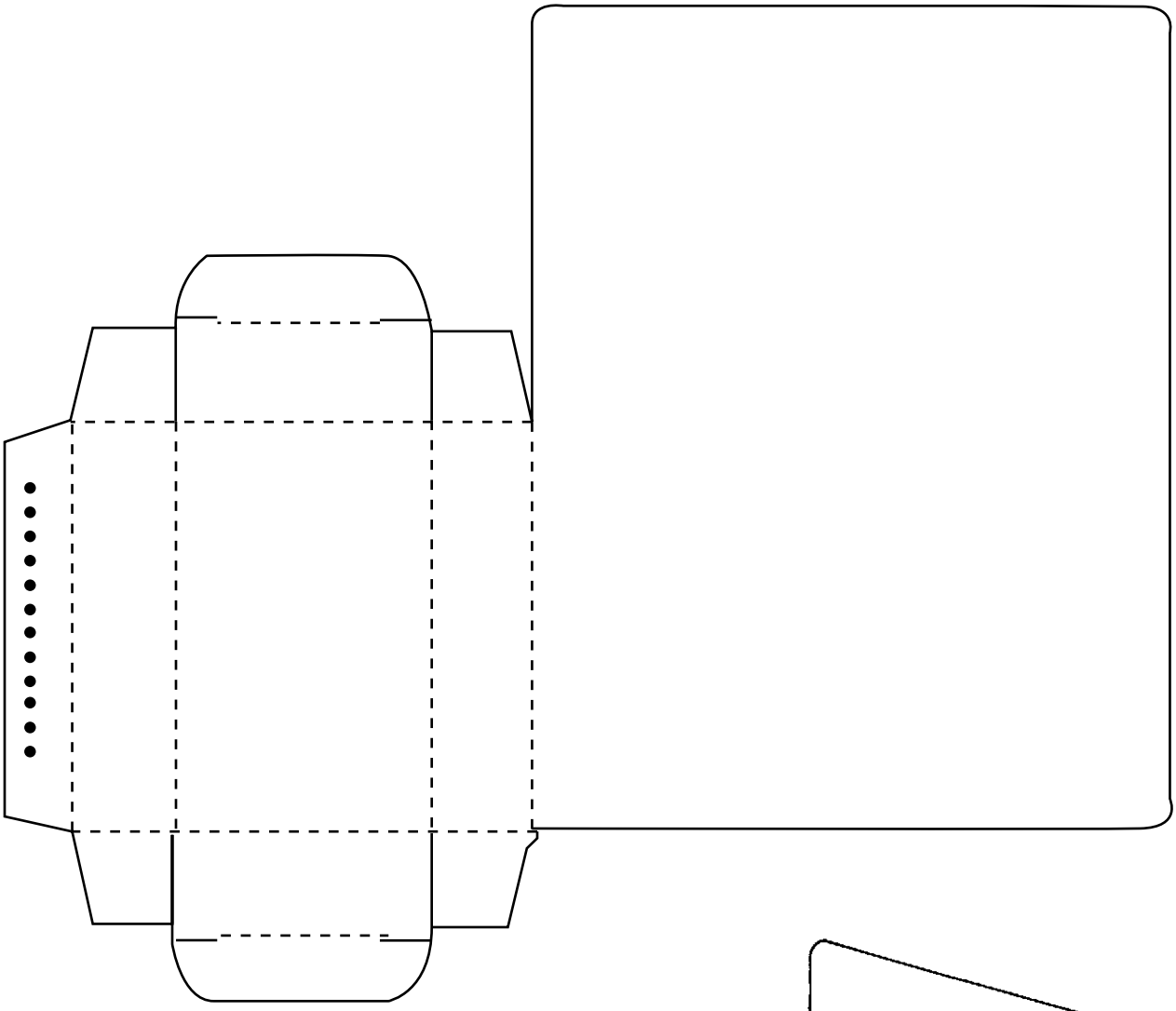


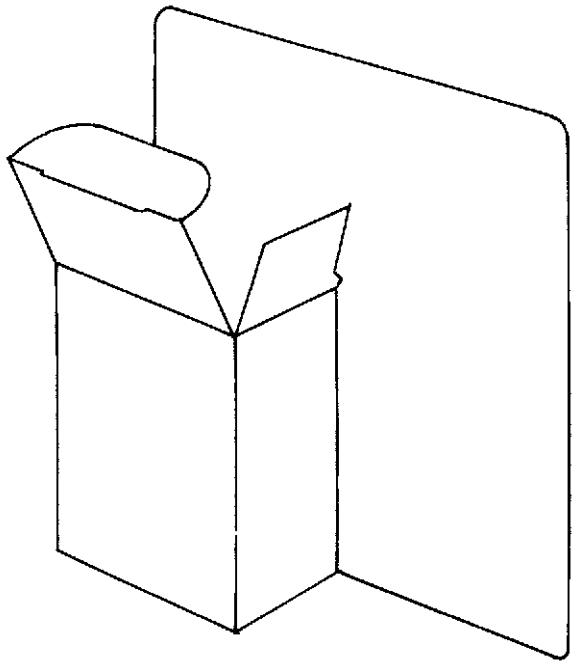

Grain Direction

STRAIGHT TUCK WITH FIFTH PANEL



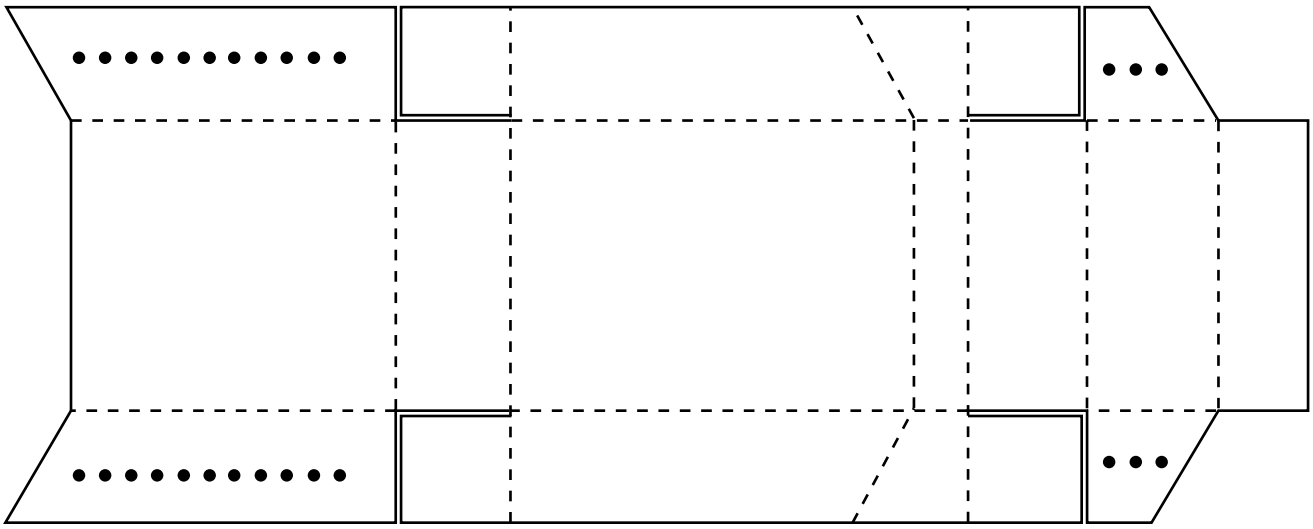


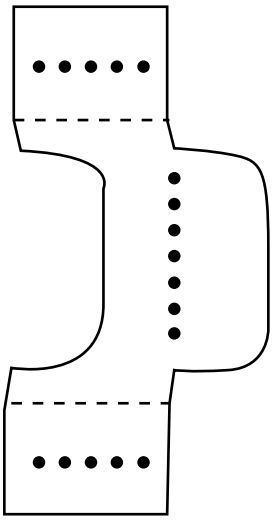


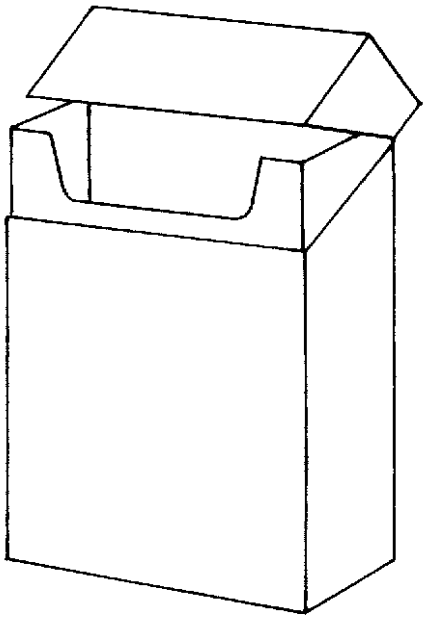


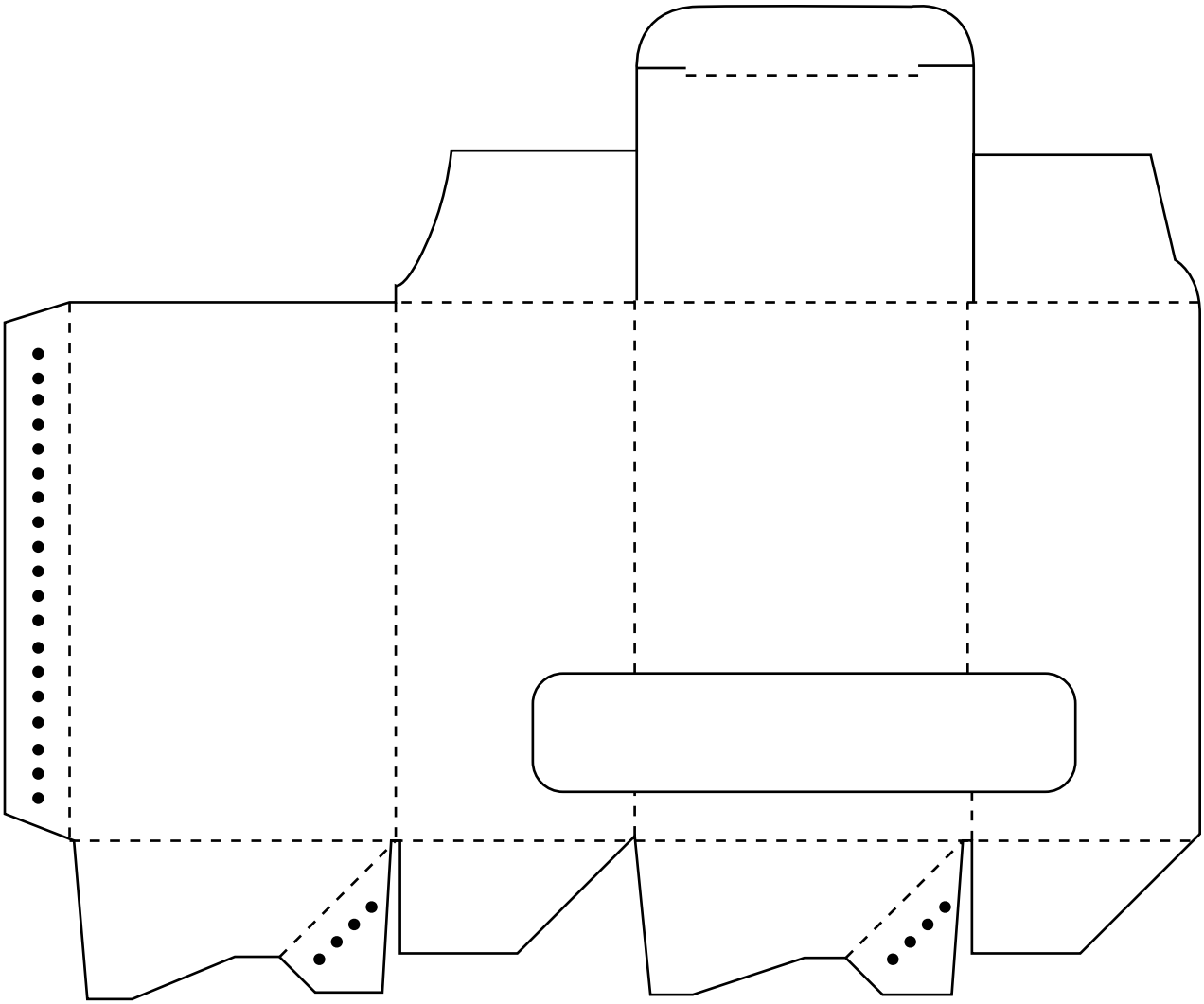
The double fifth panel permits printing on one side of the board, with copy appearing on the back panel.

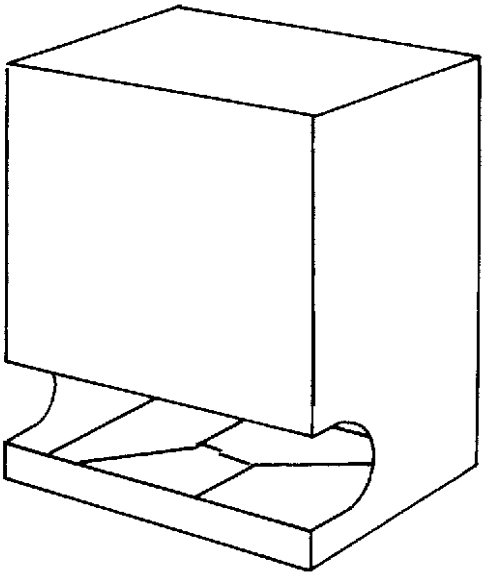
FLIP-TOP DISPENSER BOX



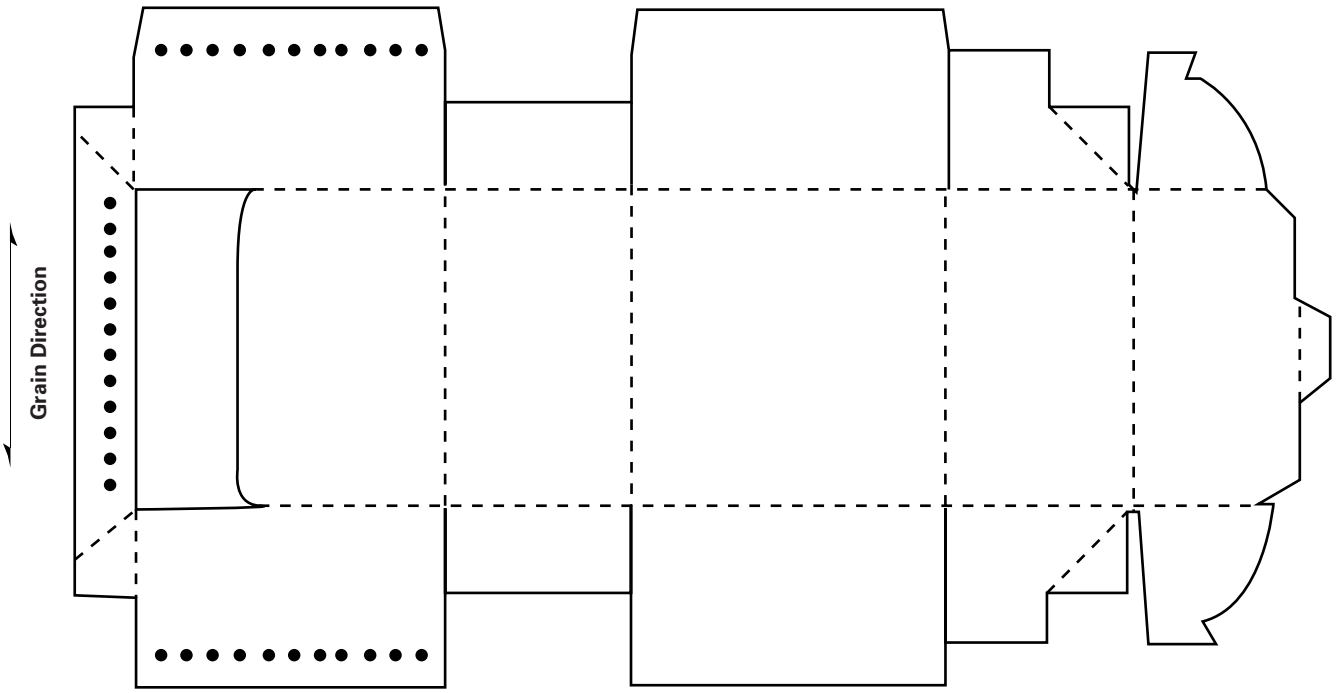


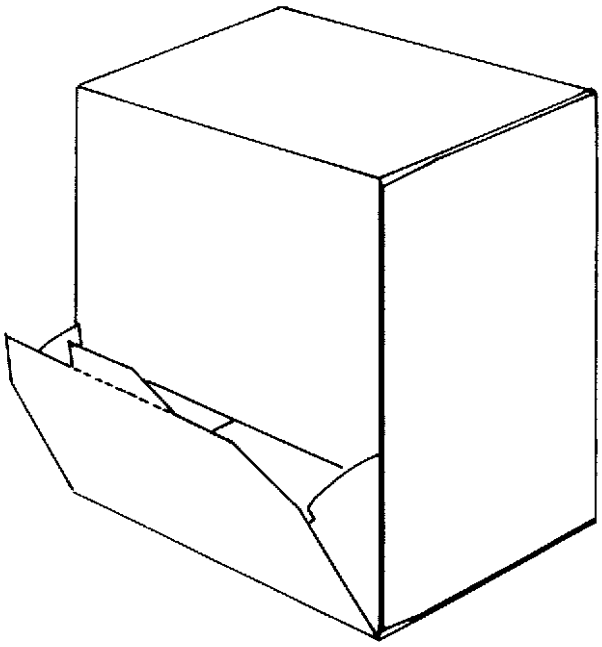


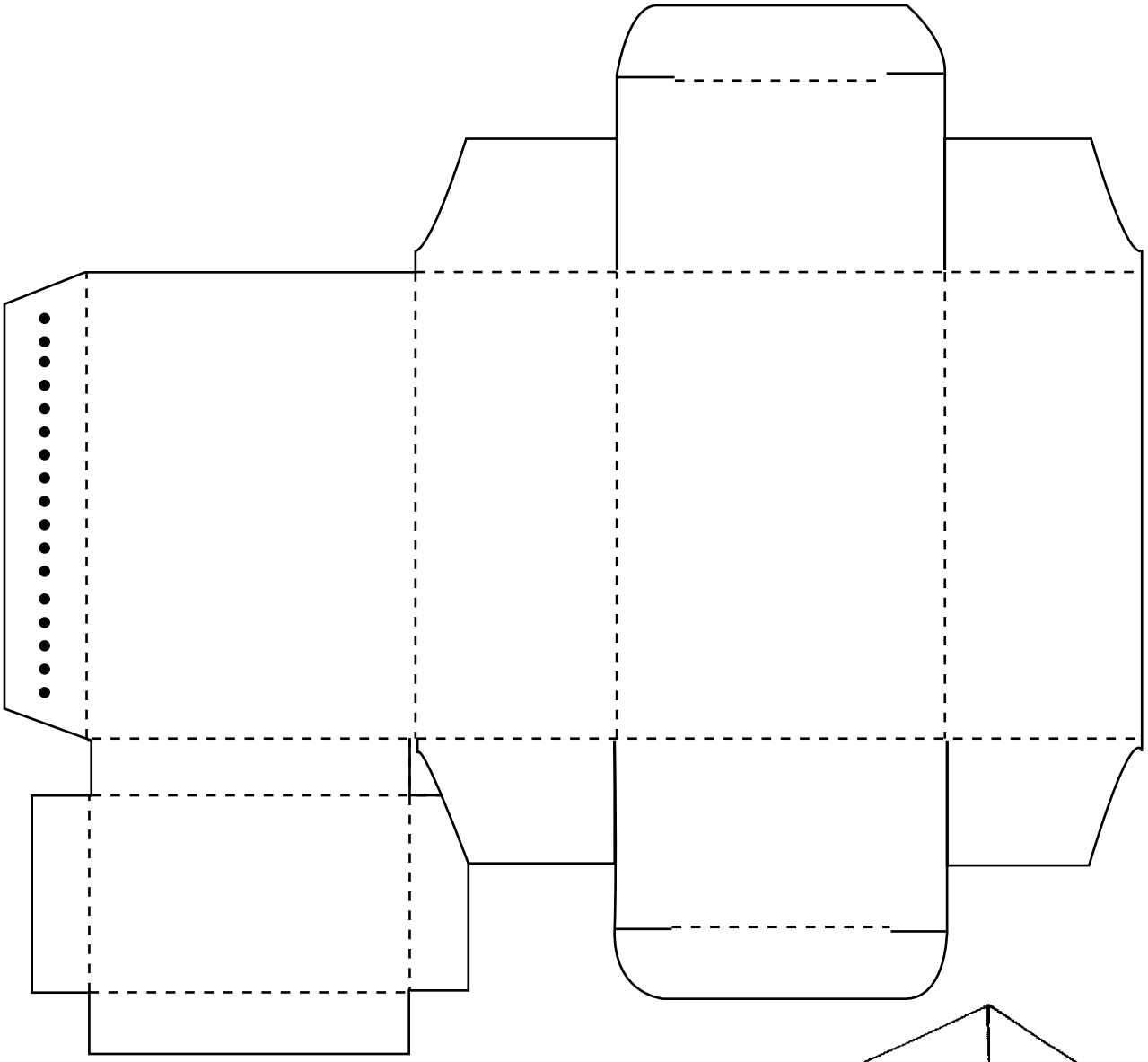


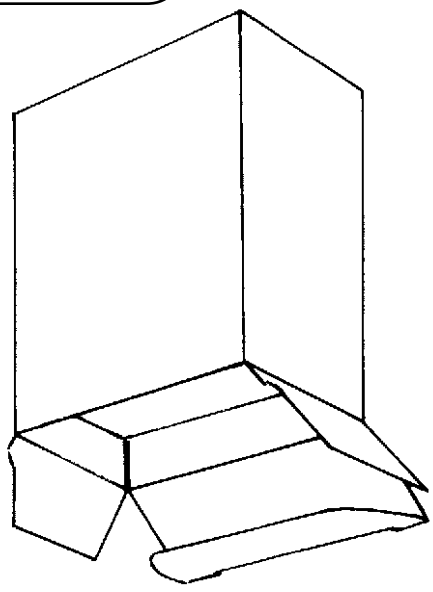


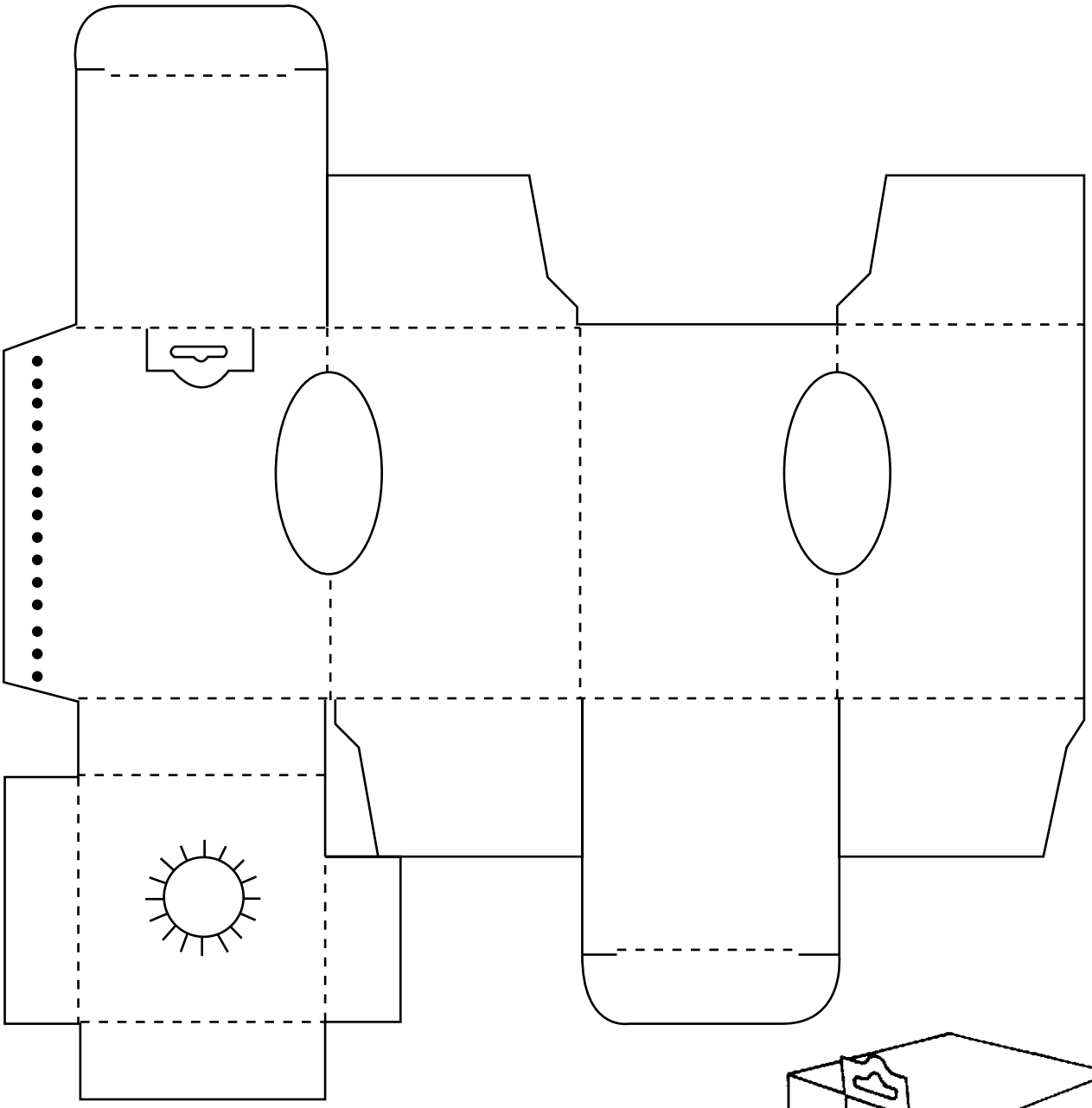
SEALABLE DISPENSER

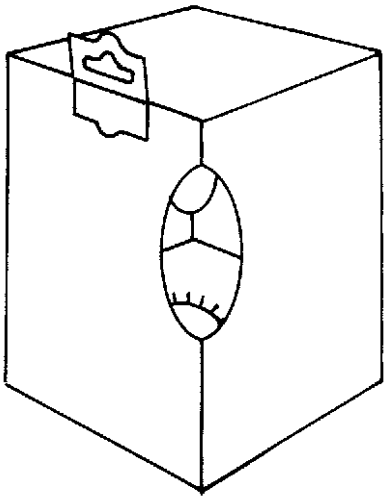






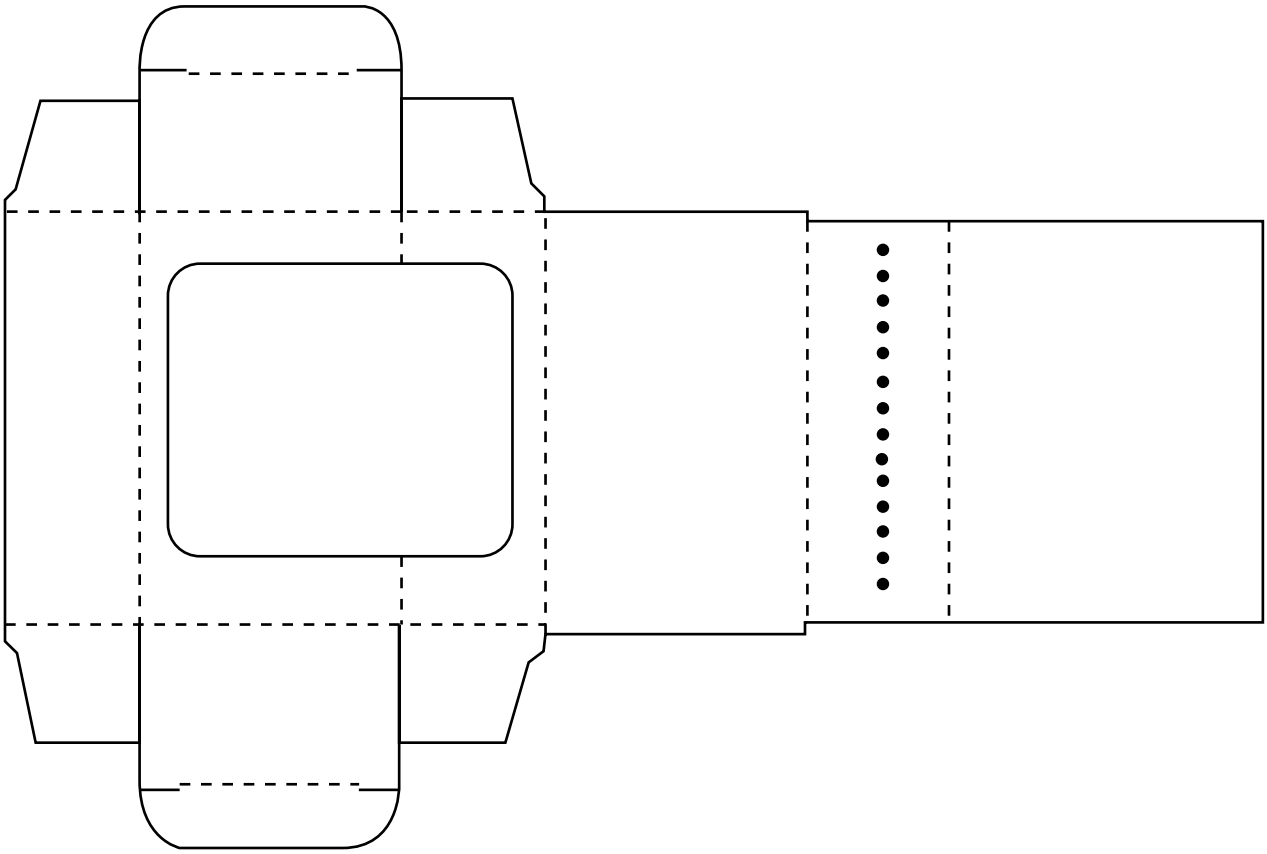


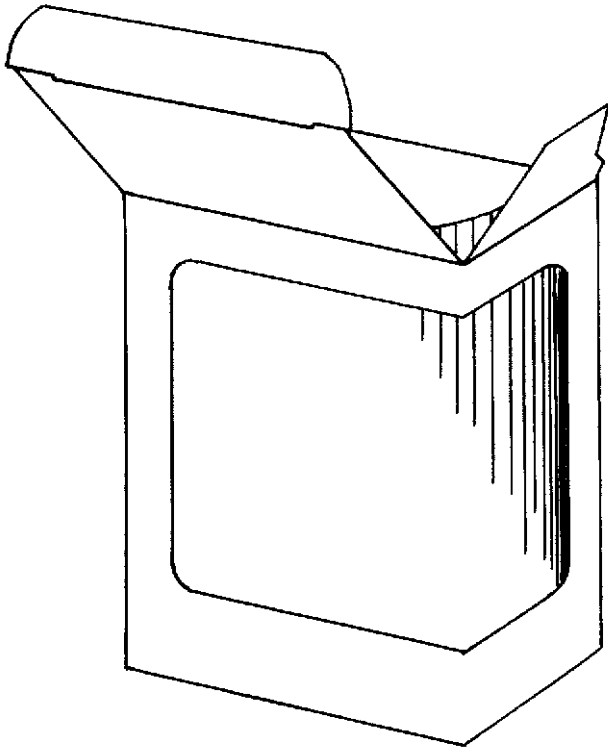




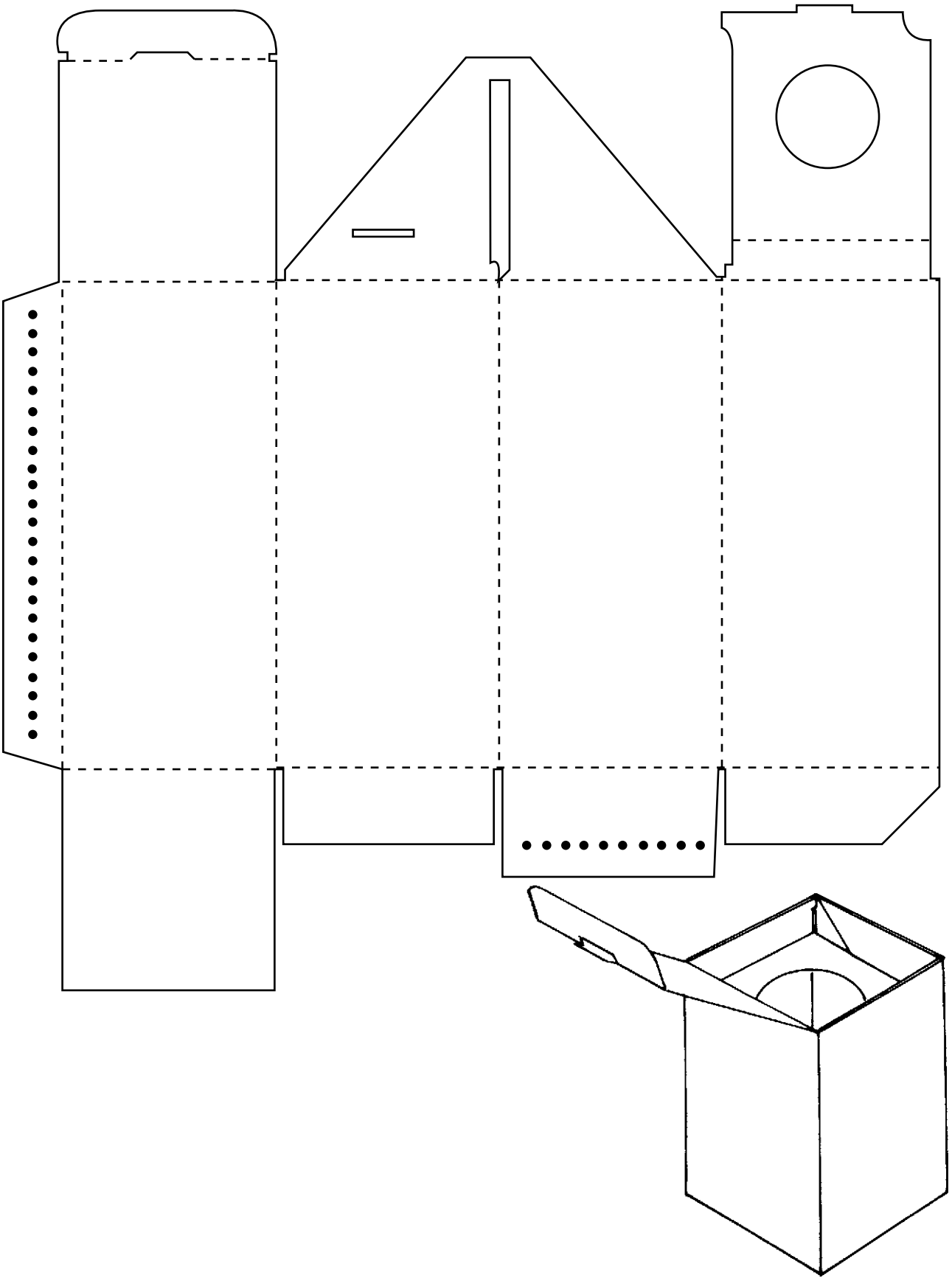
Specially designed for light bulbs

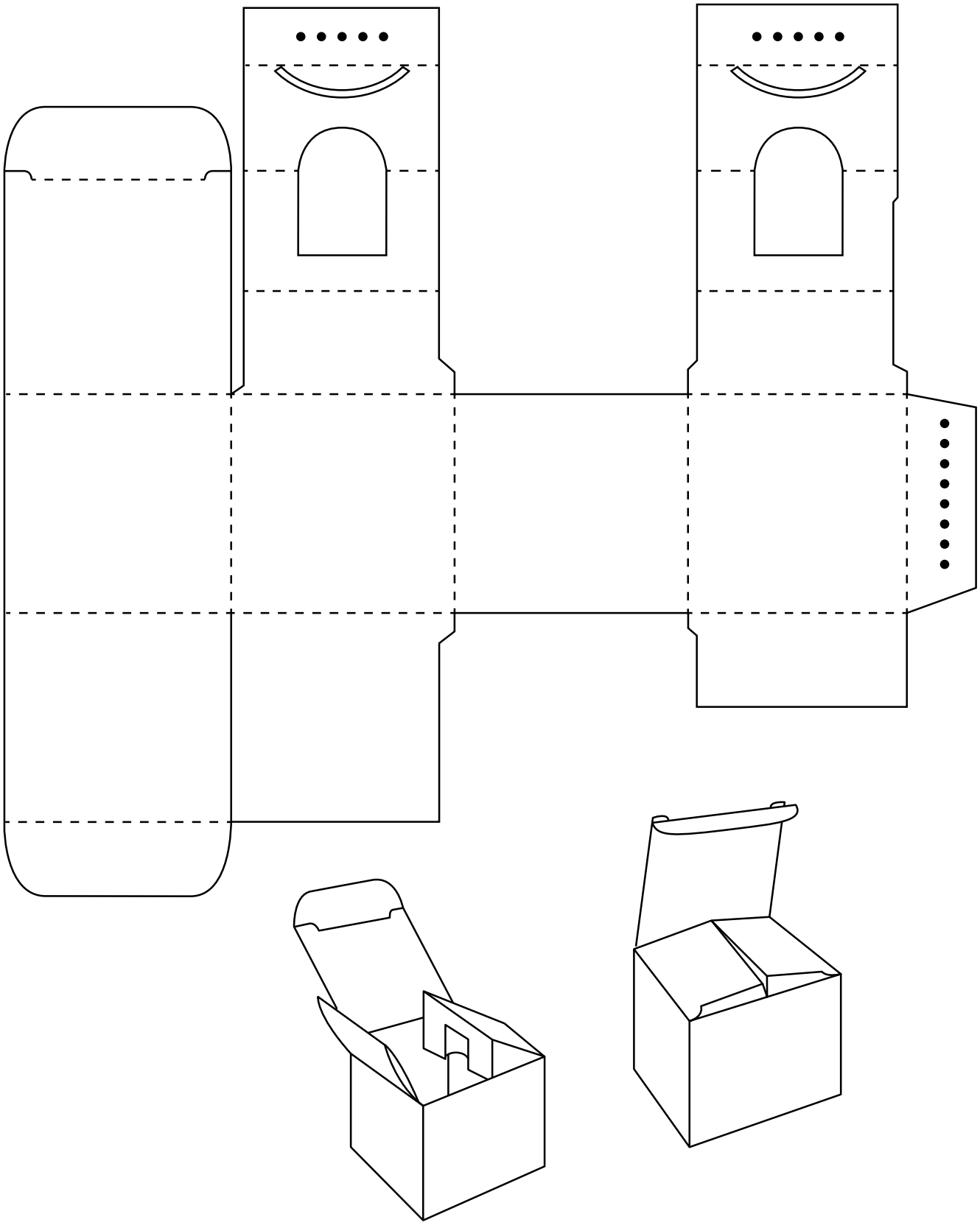
STRAIGHT TUCK WITH SPECIAL PANEL TO BE SEEN THROUGH WINDOW



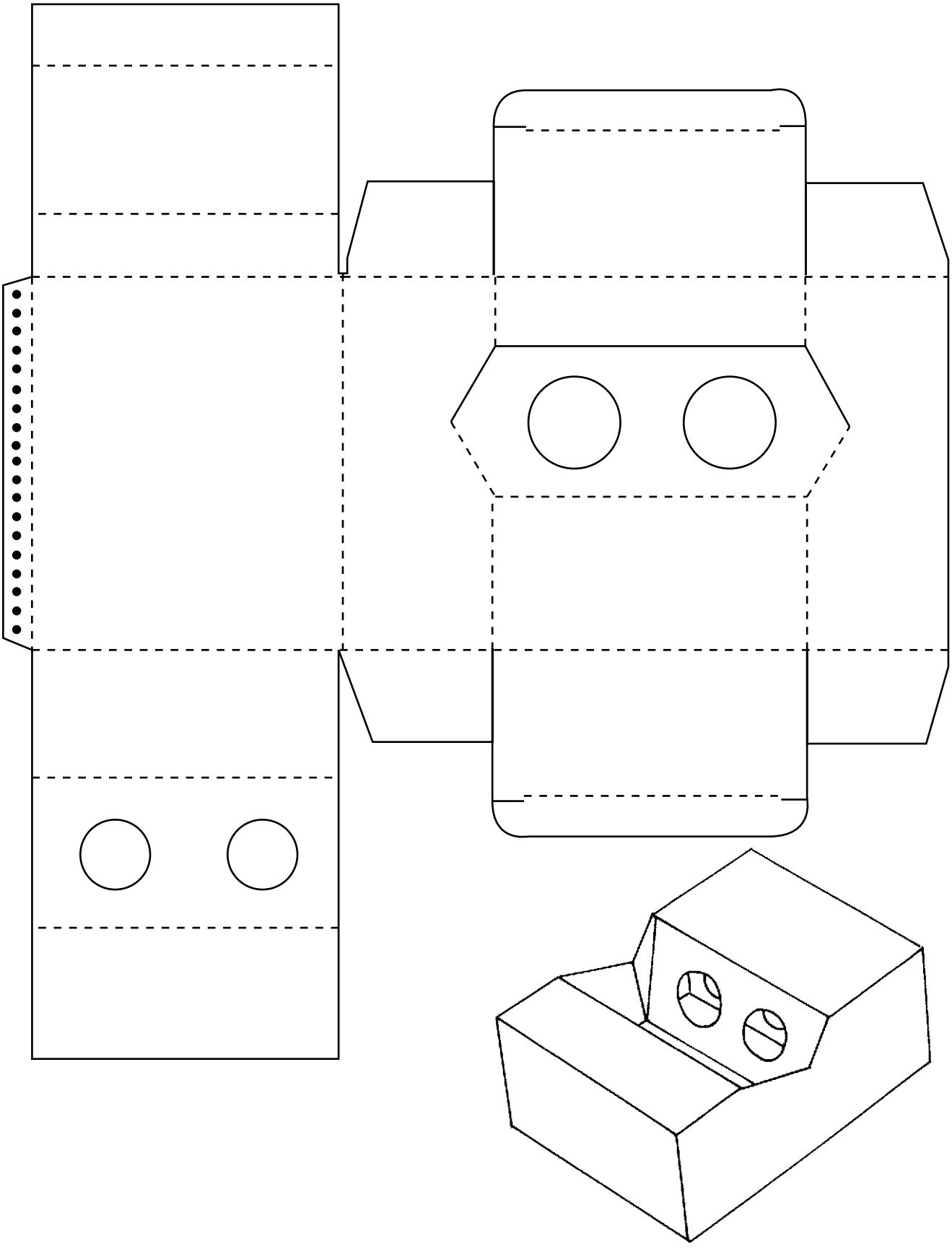


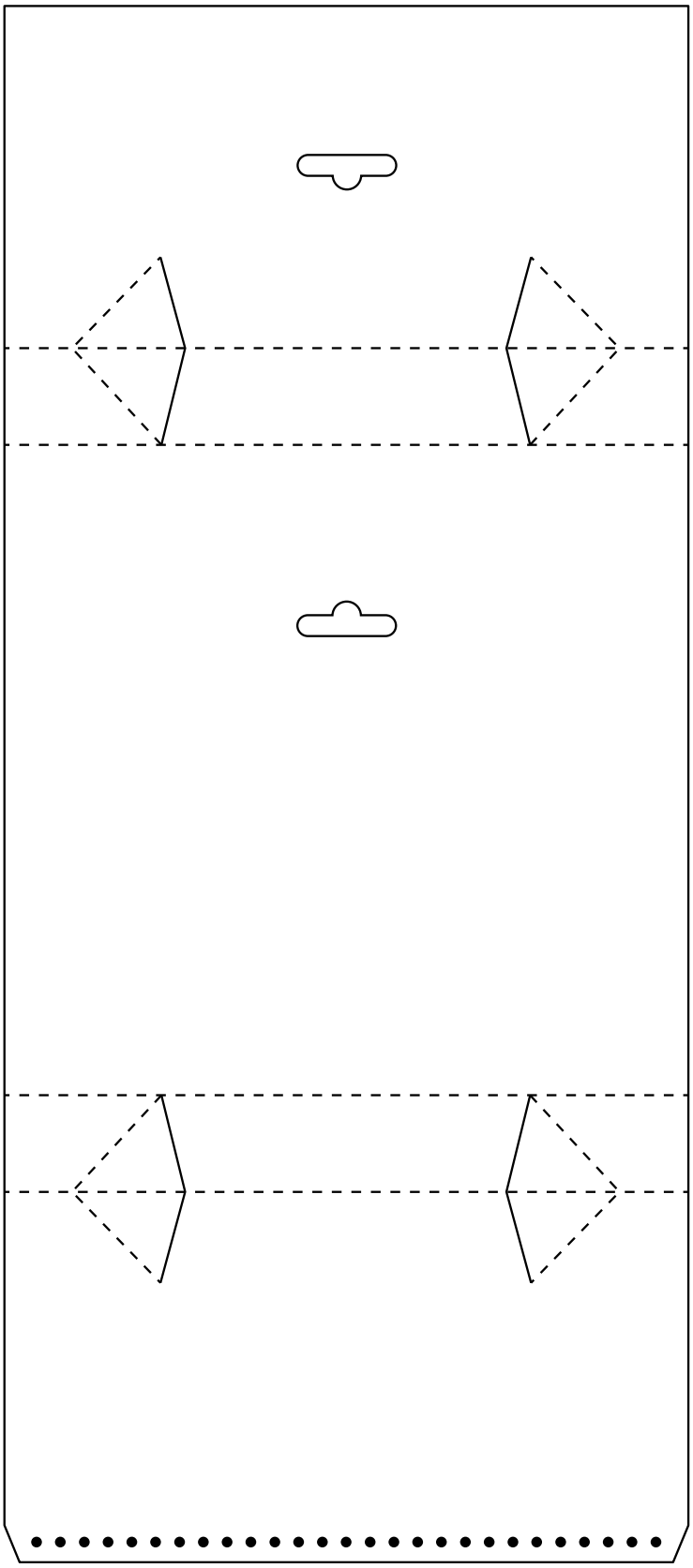
BOTTLE CONTAINER WITH RECESSED NECK RETAINER

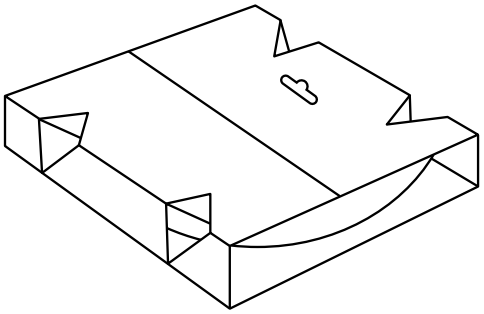




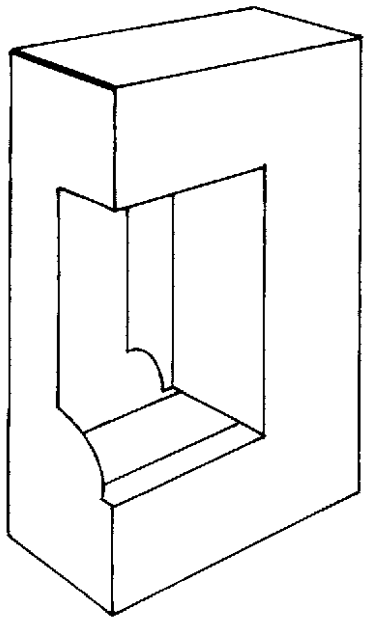
TWO-COUNT LIGHT BULB PACK



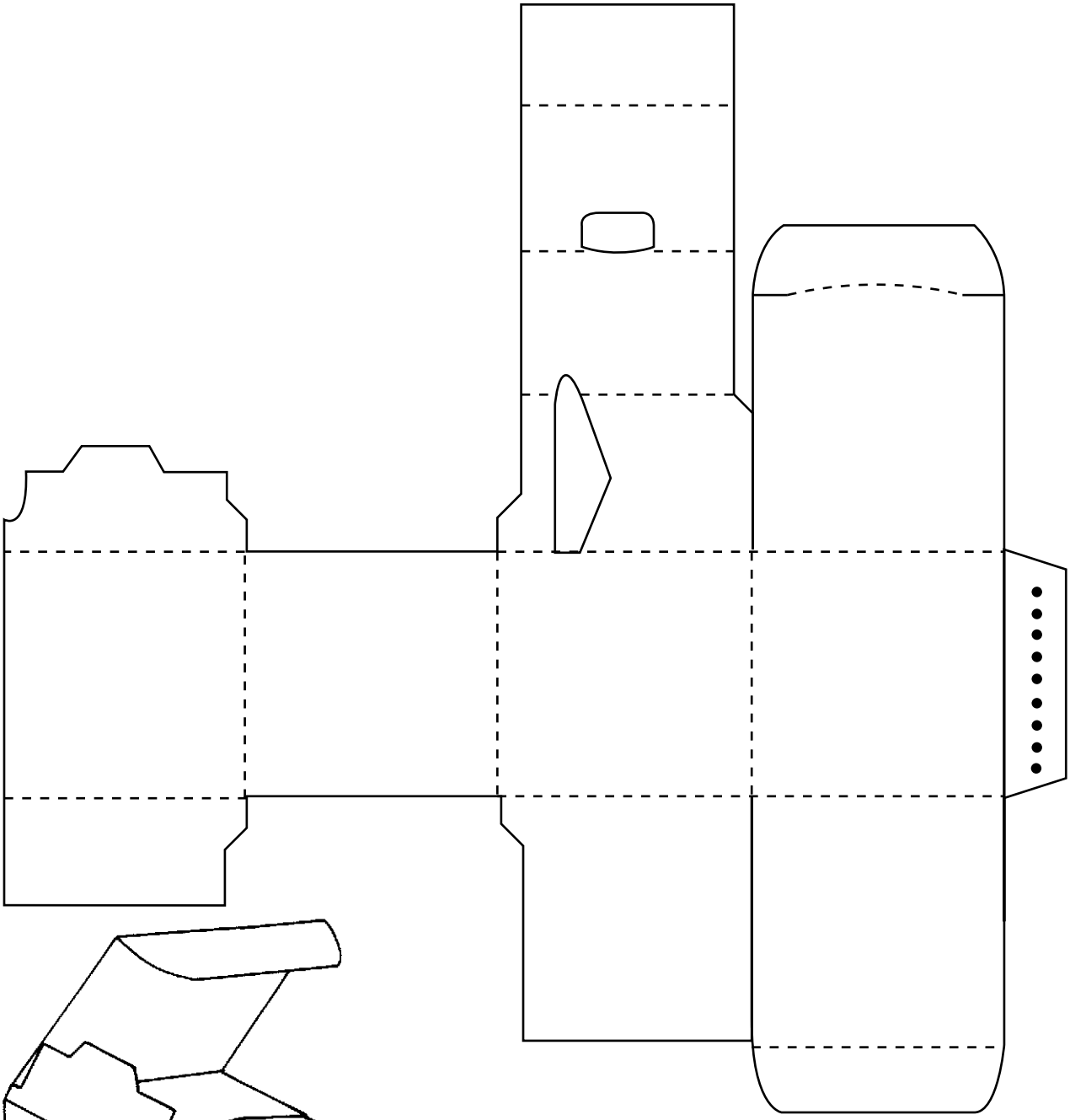


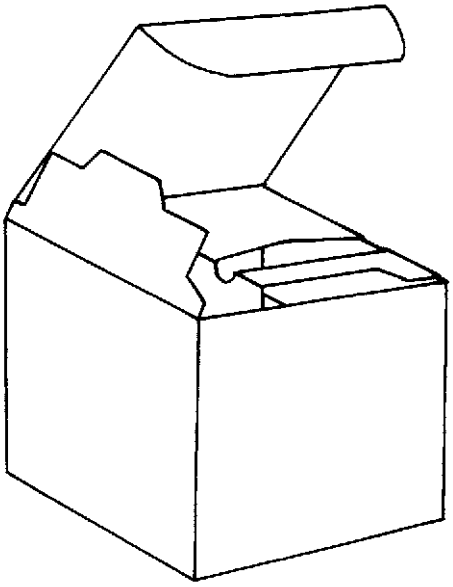


REVERSE TUCK WITH PARTITION FORMED BY THE DIE-CUT WINDOW

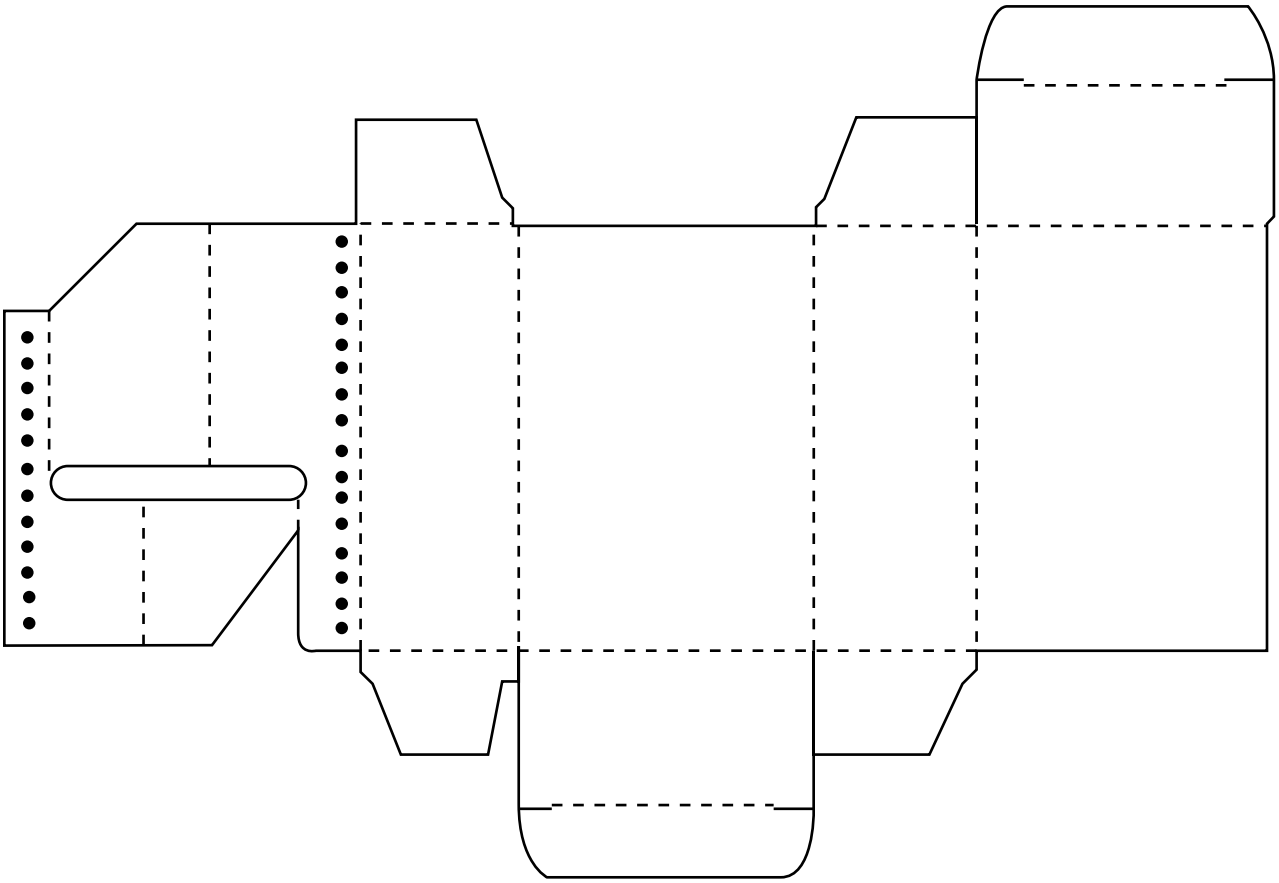


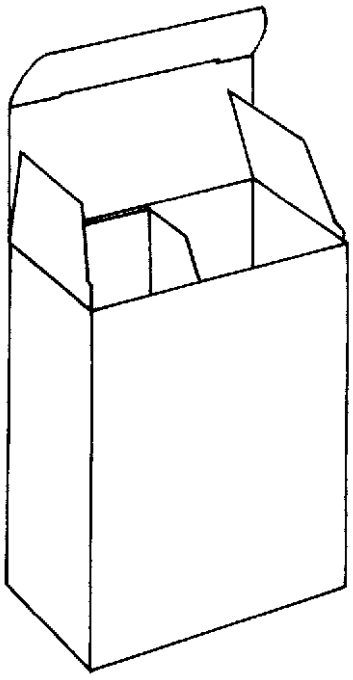
STRAIGHT TUCK WITH SPECIALLY FORMED PARTITION ATTACHED TO DUST FLAP

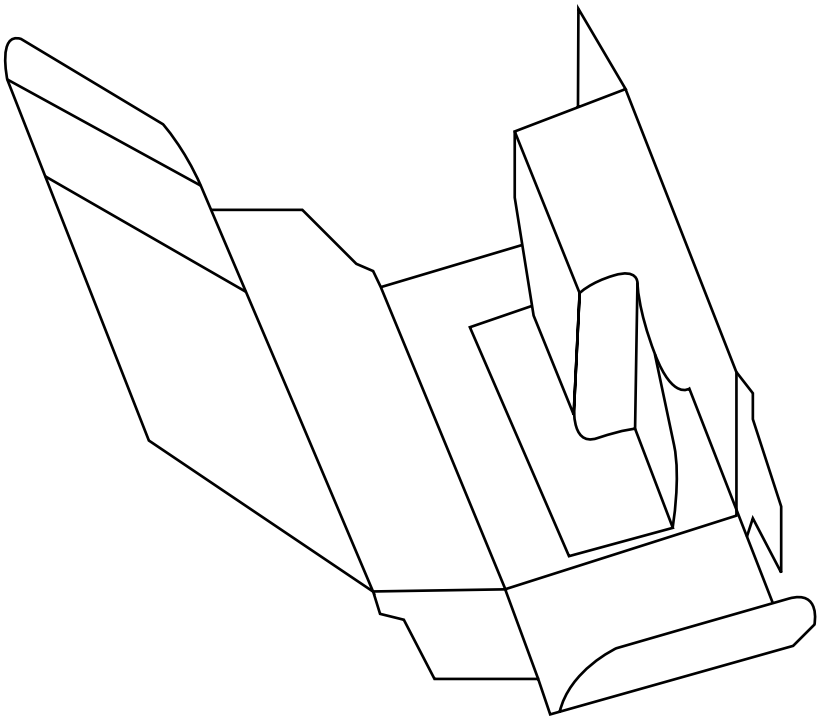


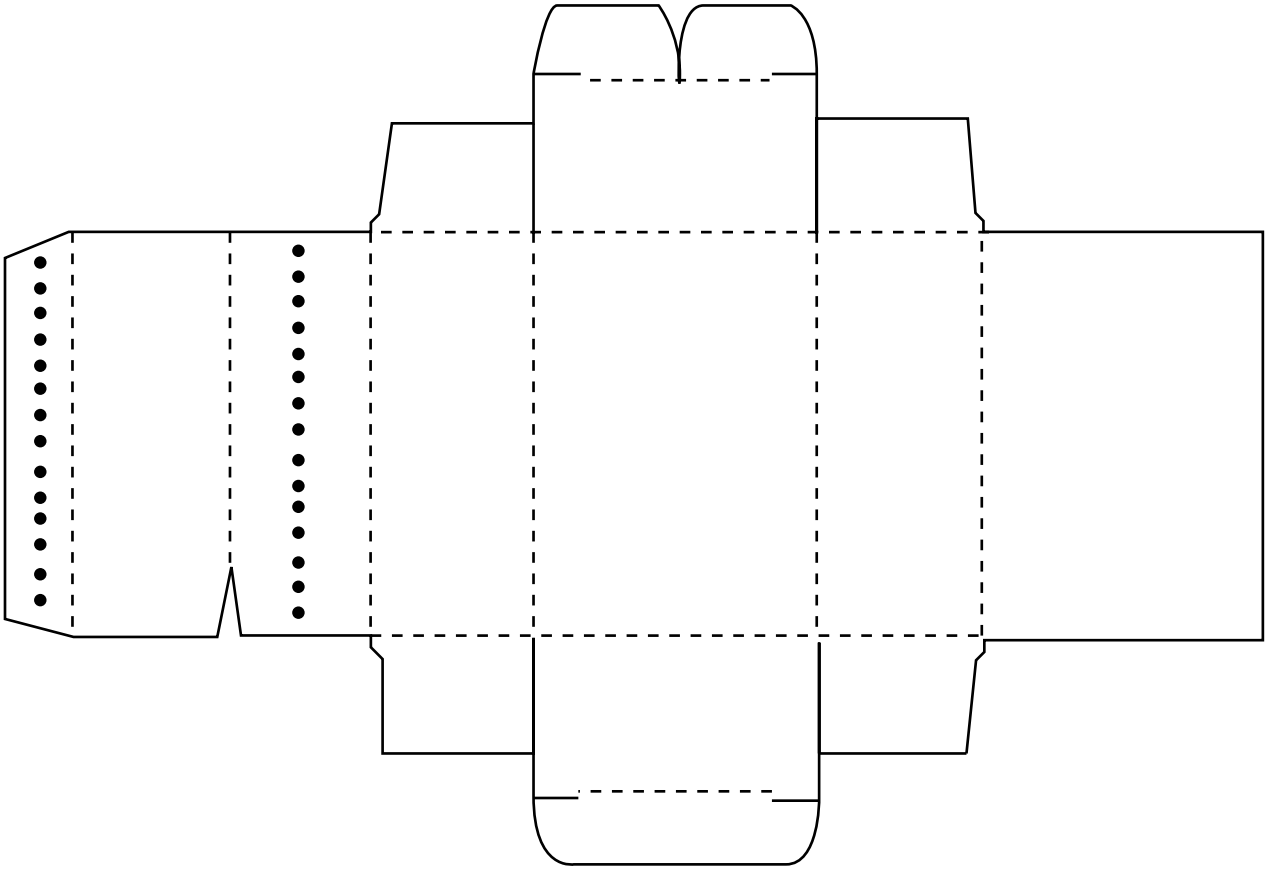


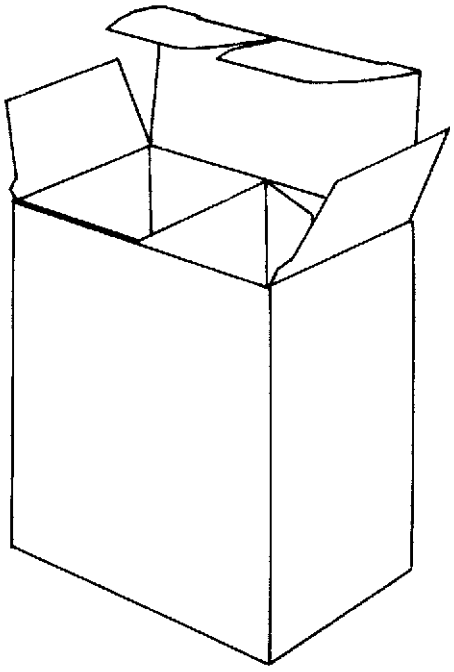
REVERSE TUCK WITH SPECIALLY CONSTRUCTED PARTITION

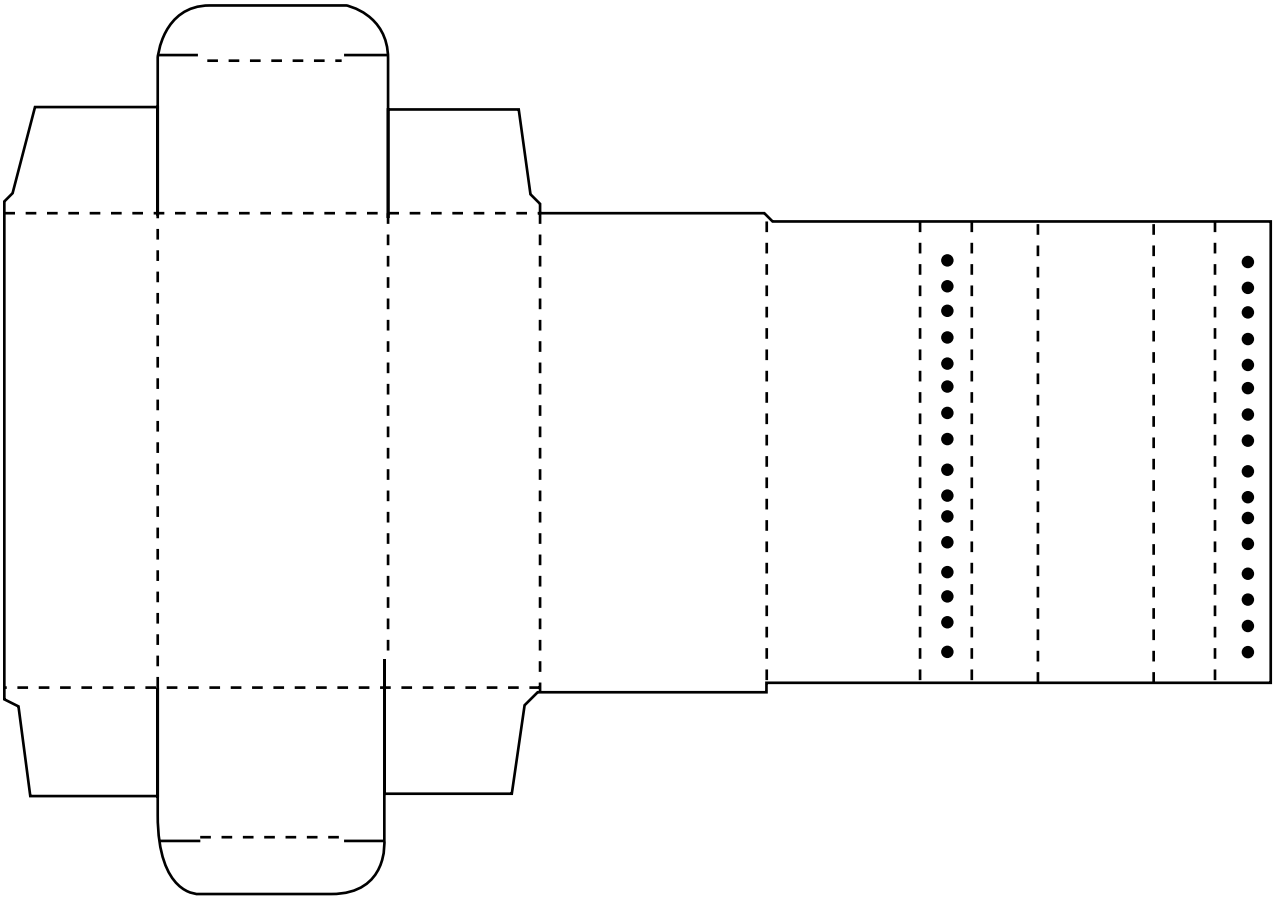


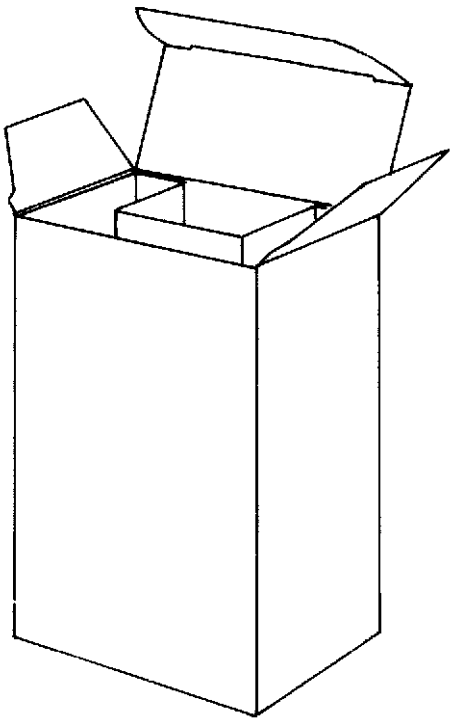


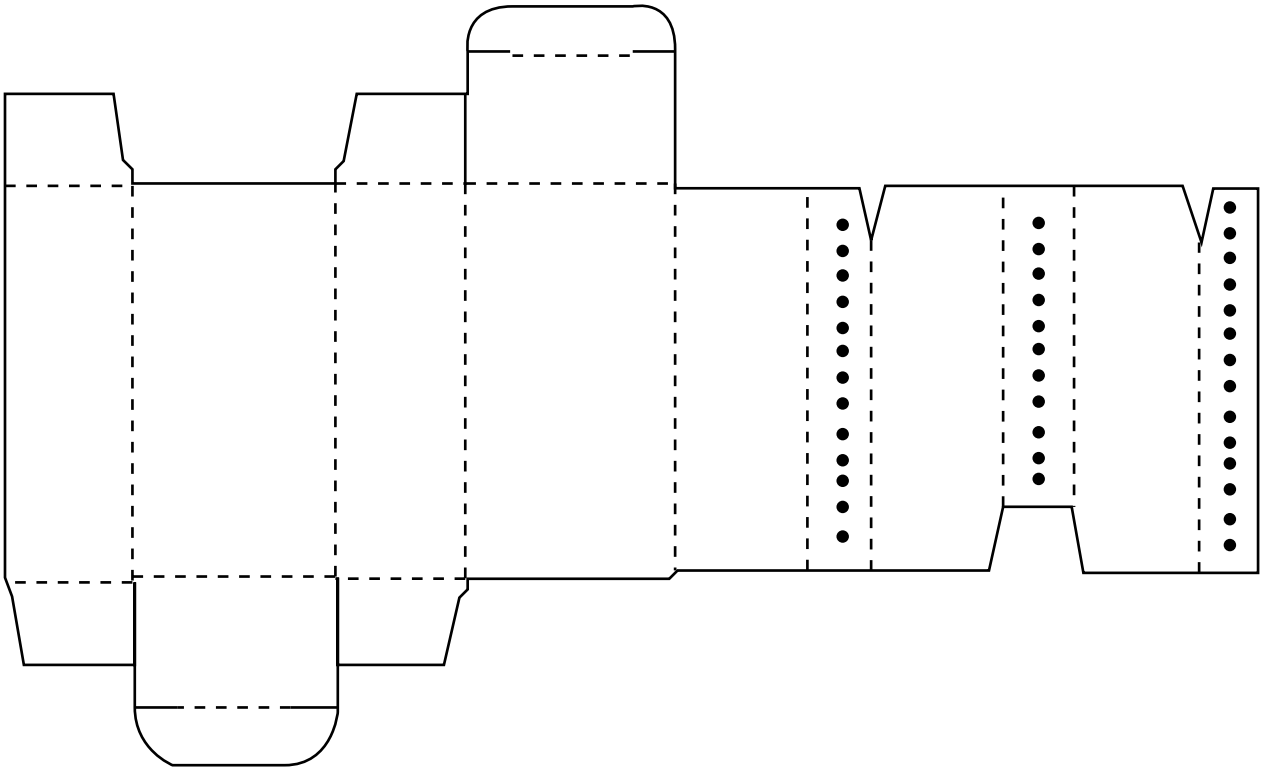


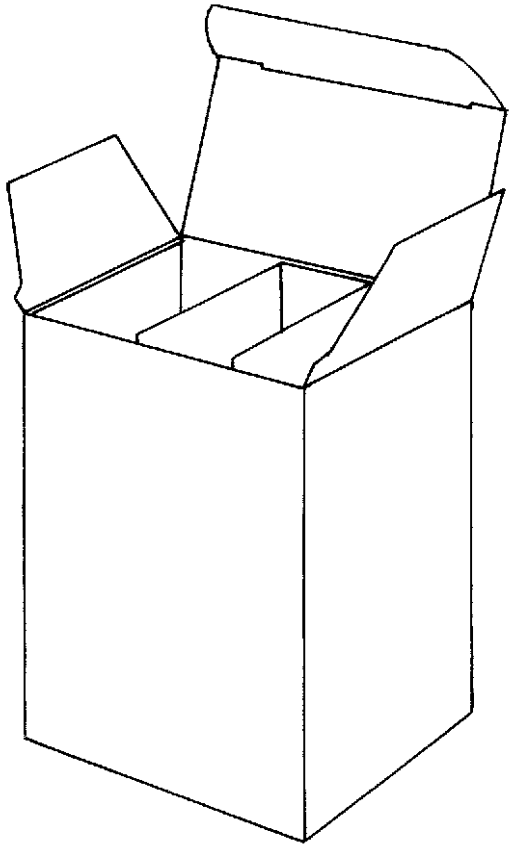




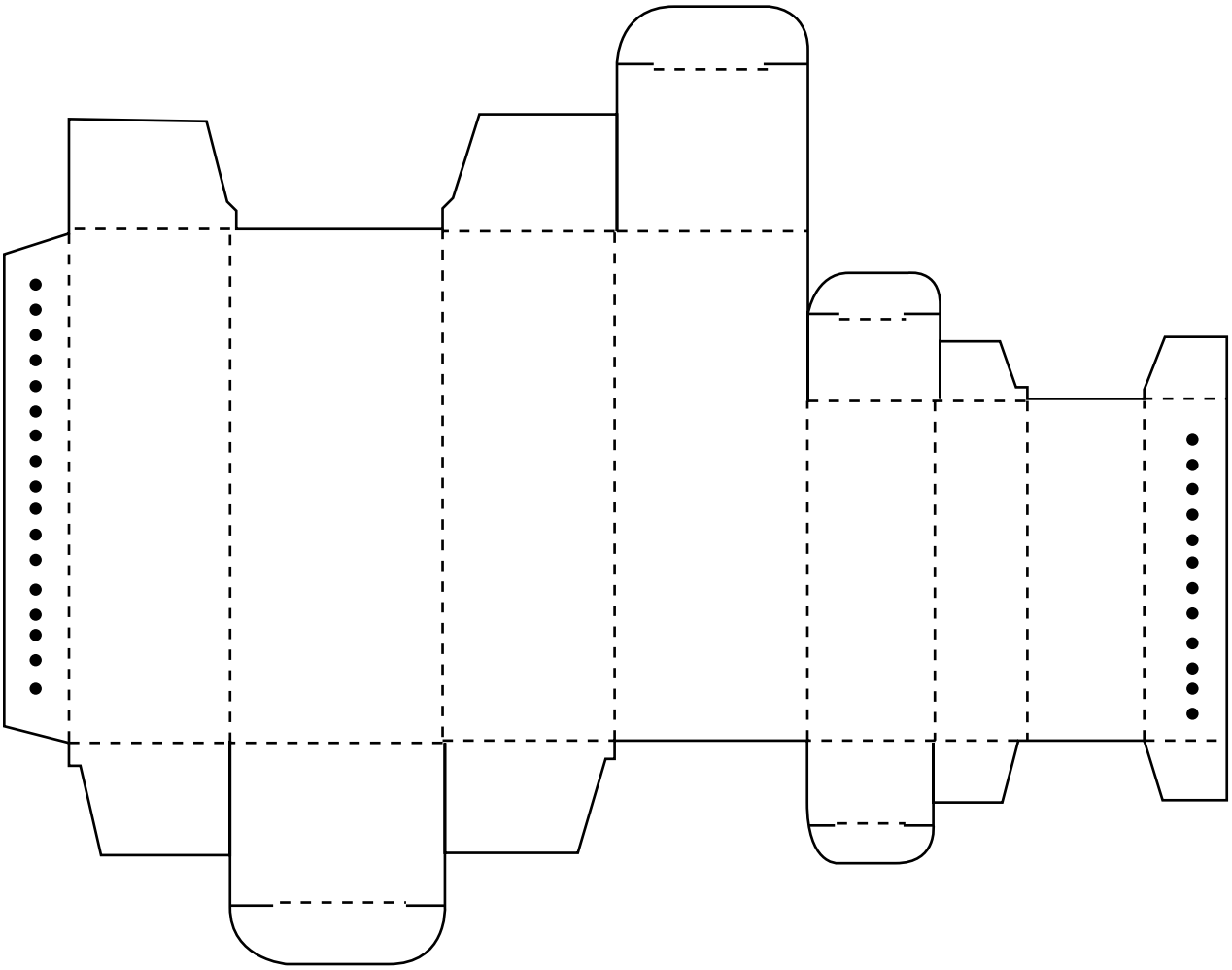


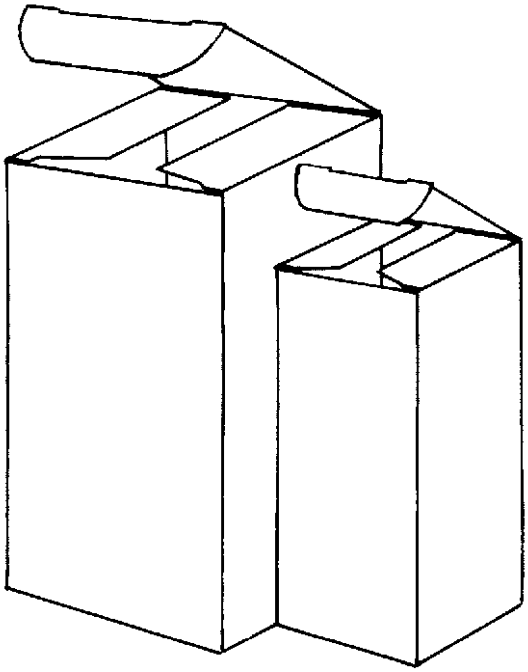


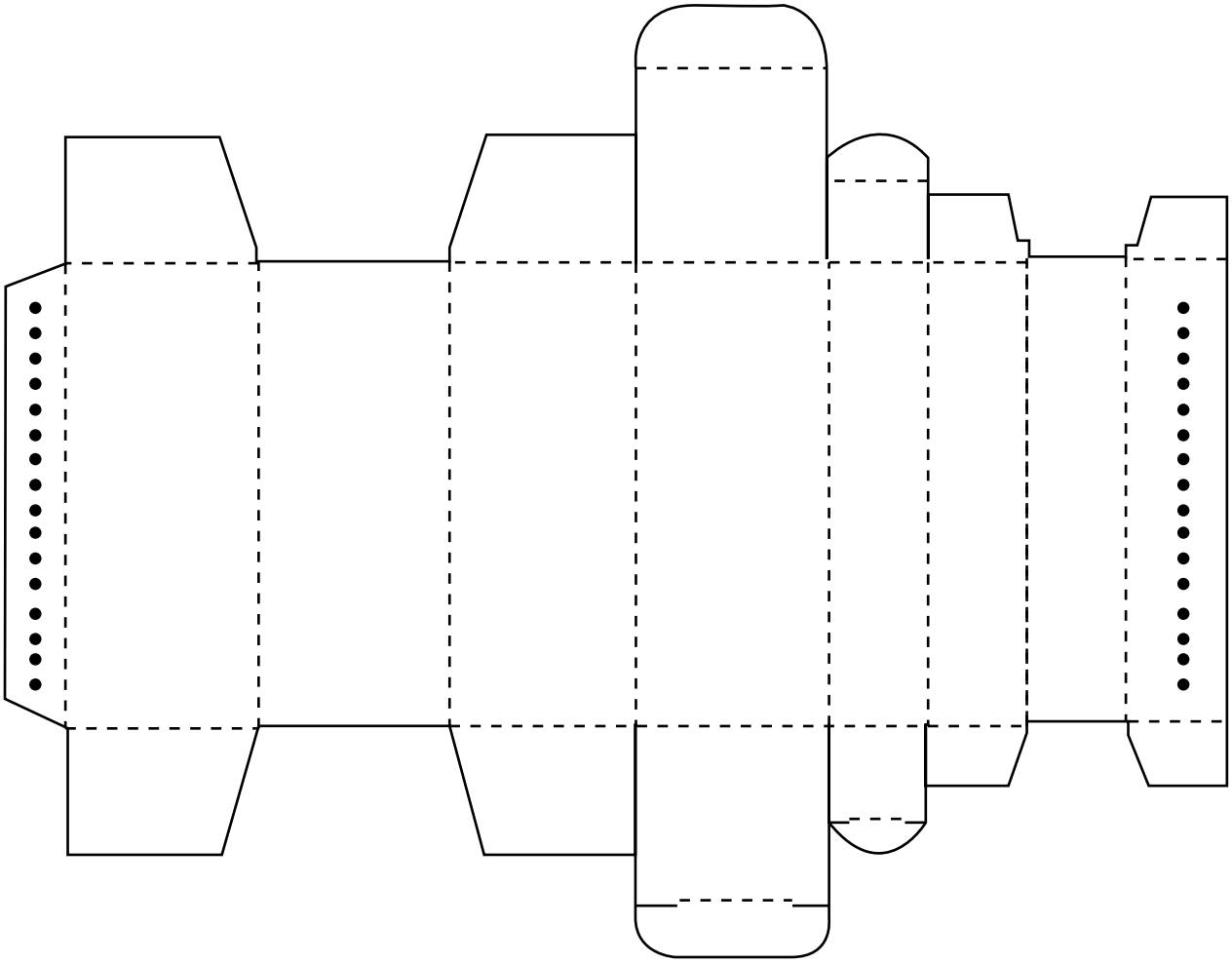


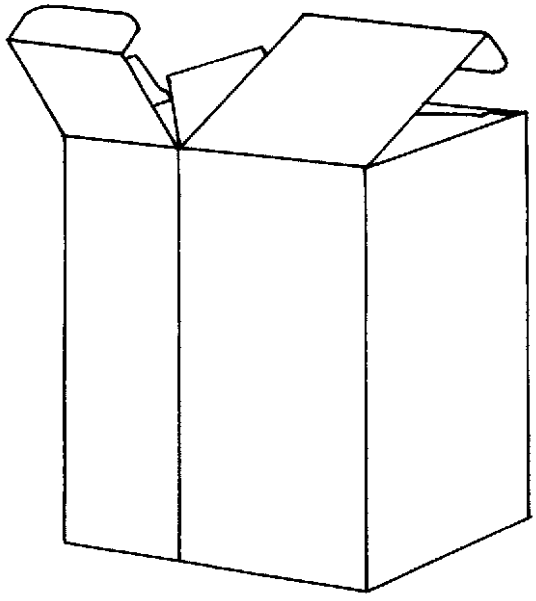


SIDE-BY-SIDE REVERSE TUCK/STRAIGHT TUCK CARTONS, VARYING IN HEIGHT

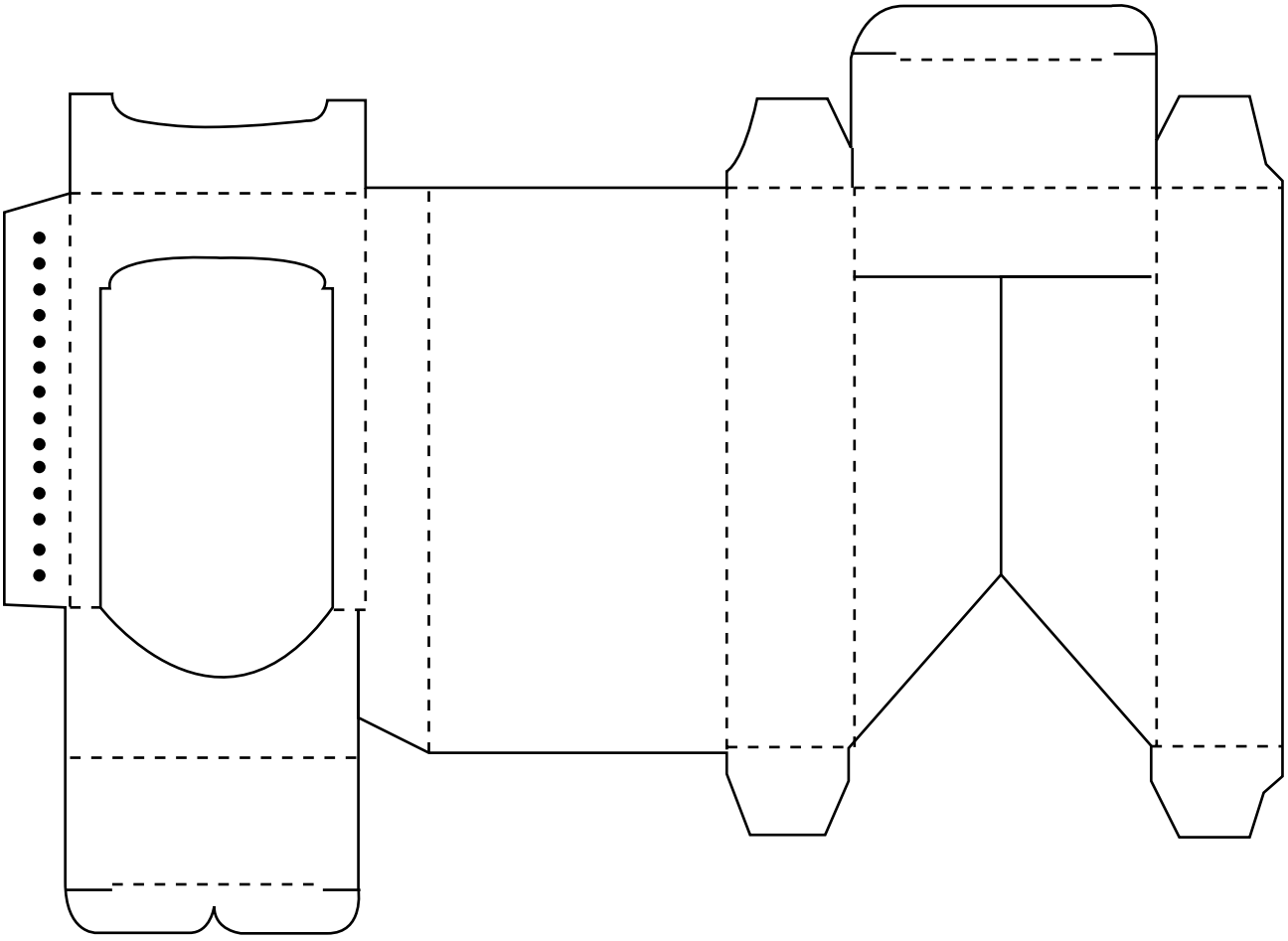


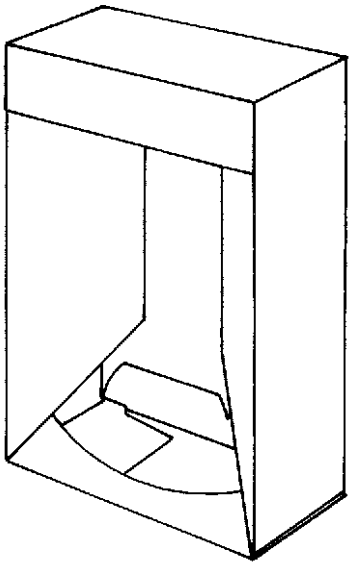


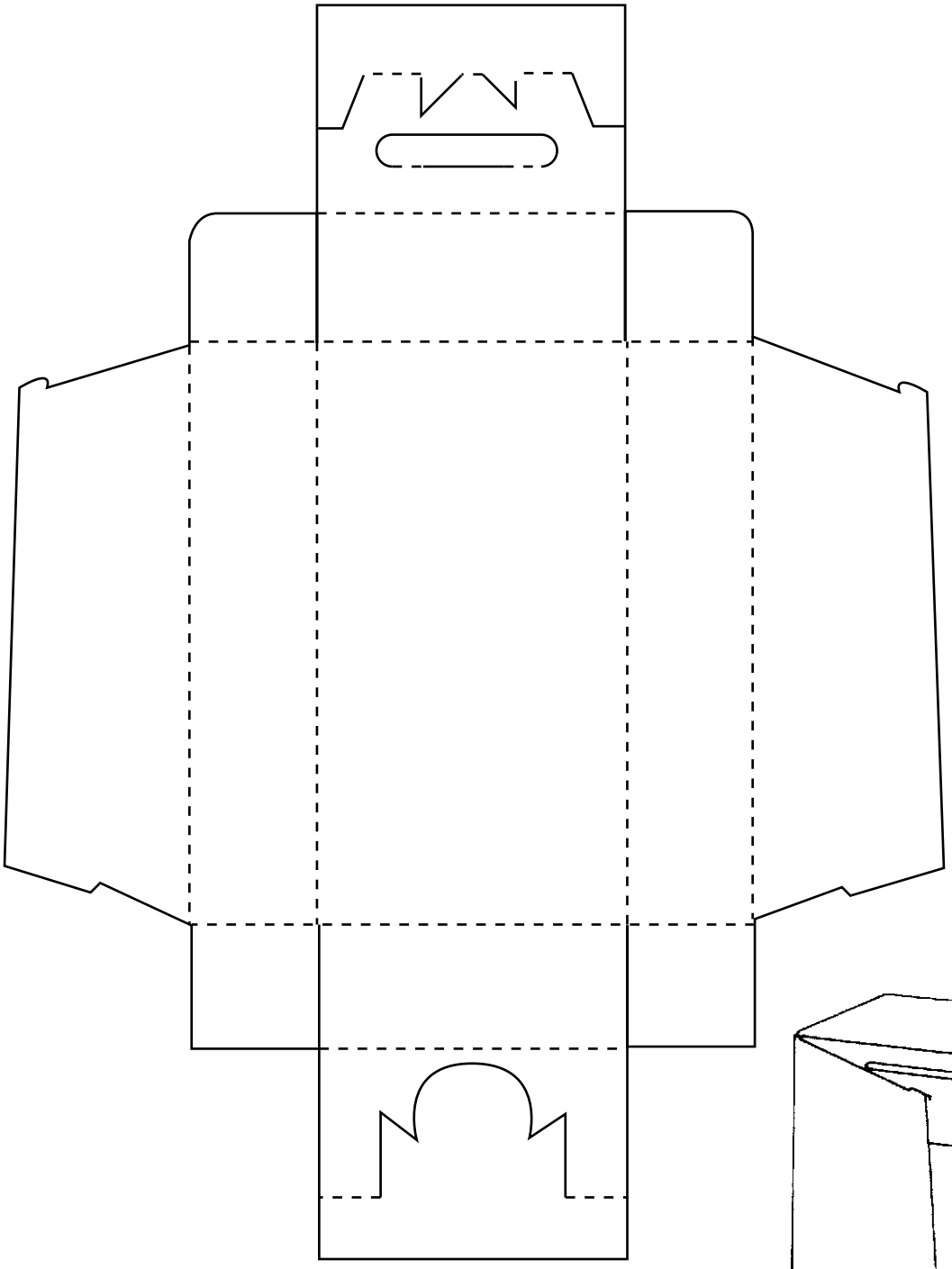


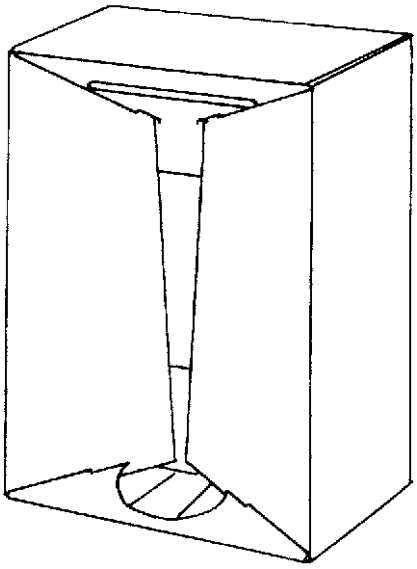


REVERSE TUCK SHADOW BOX

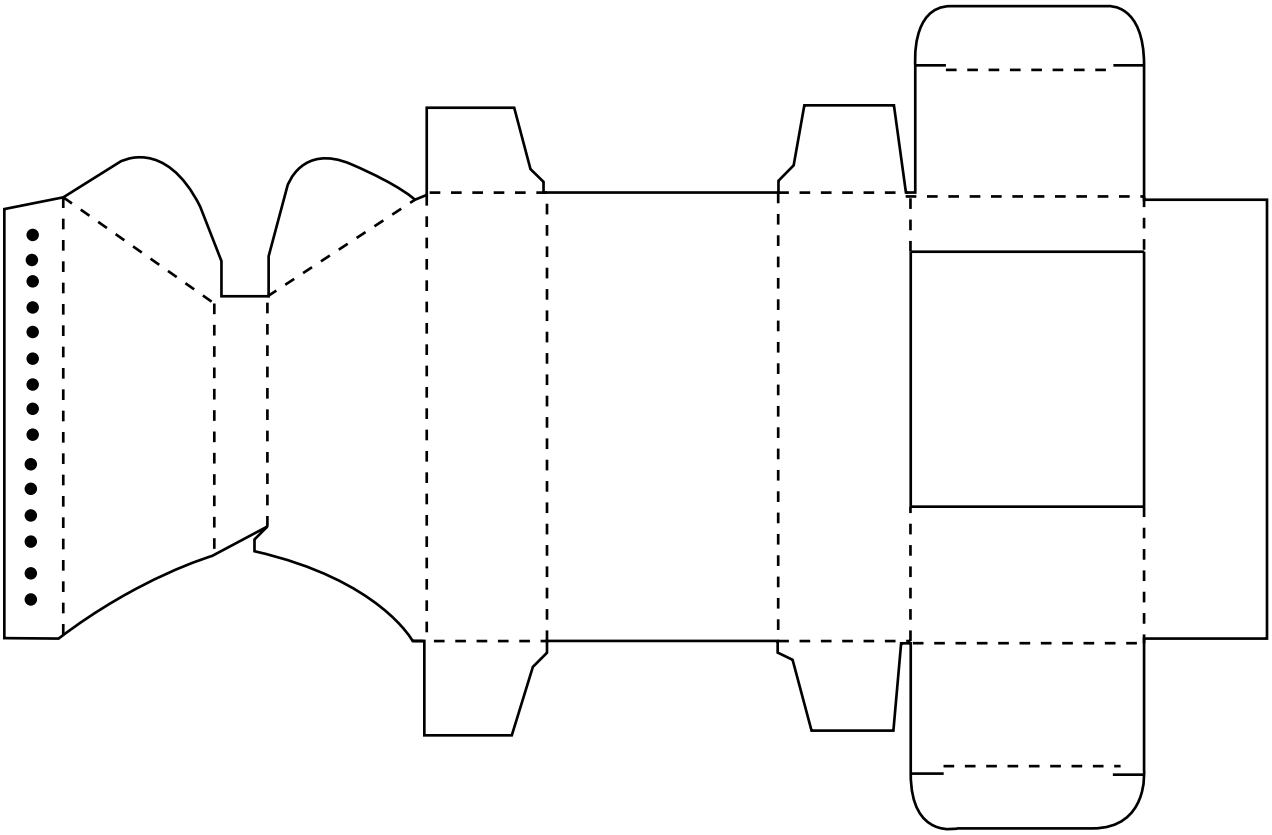


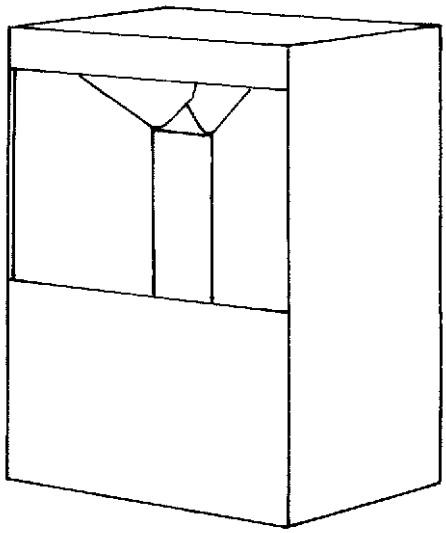


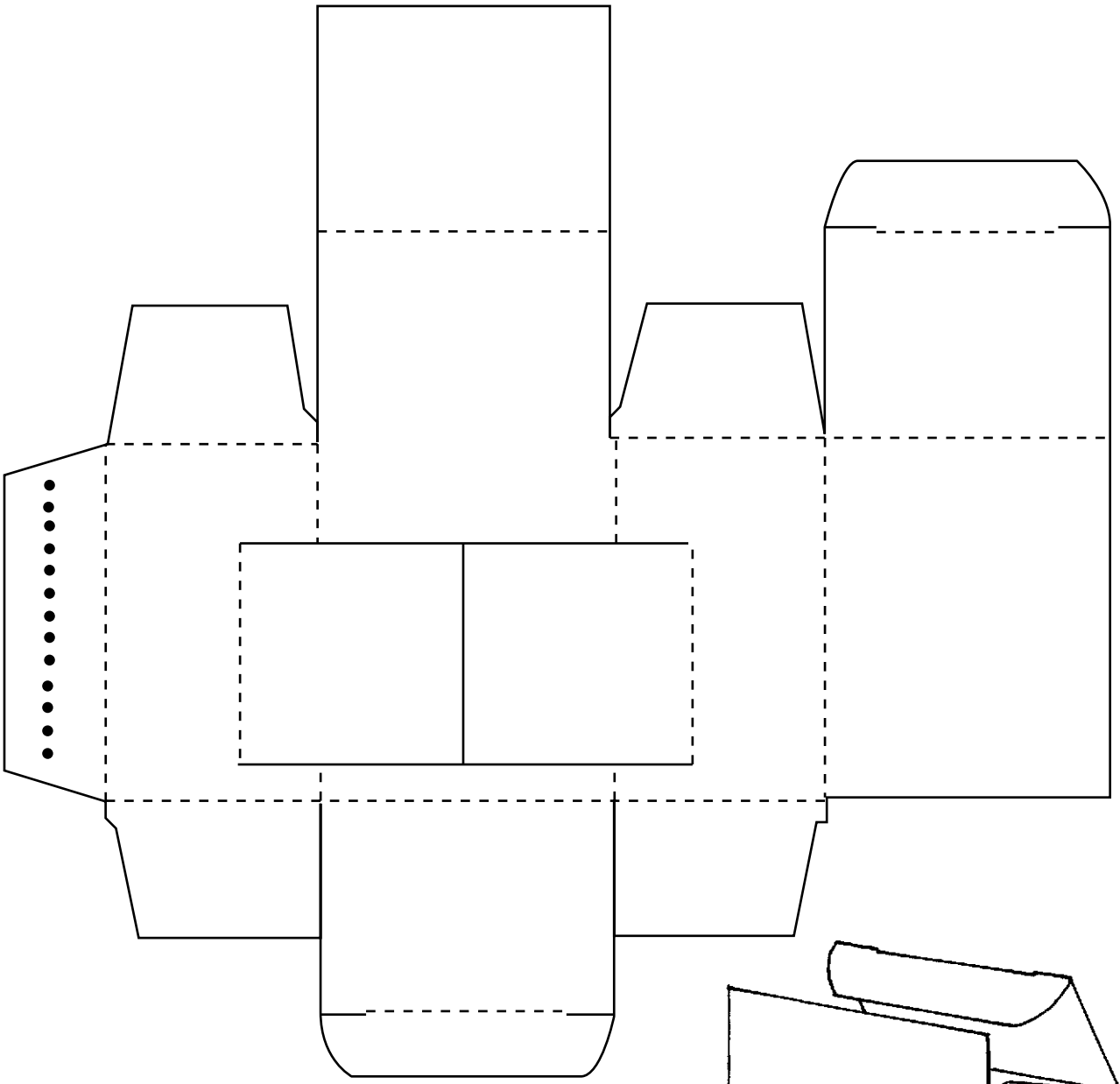


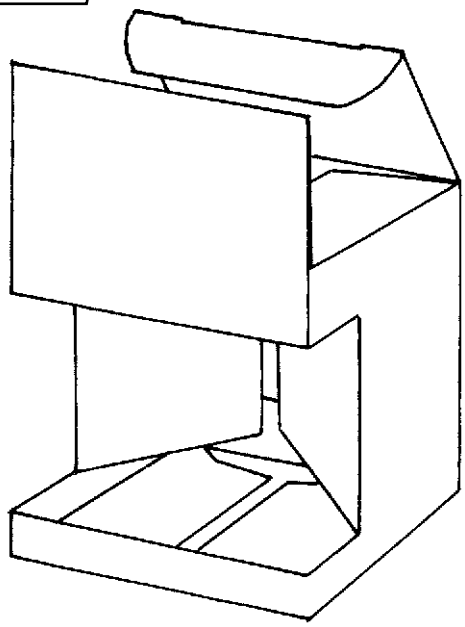


STRAIGHT TUCK SHADOW BOX

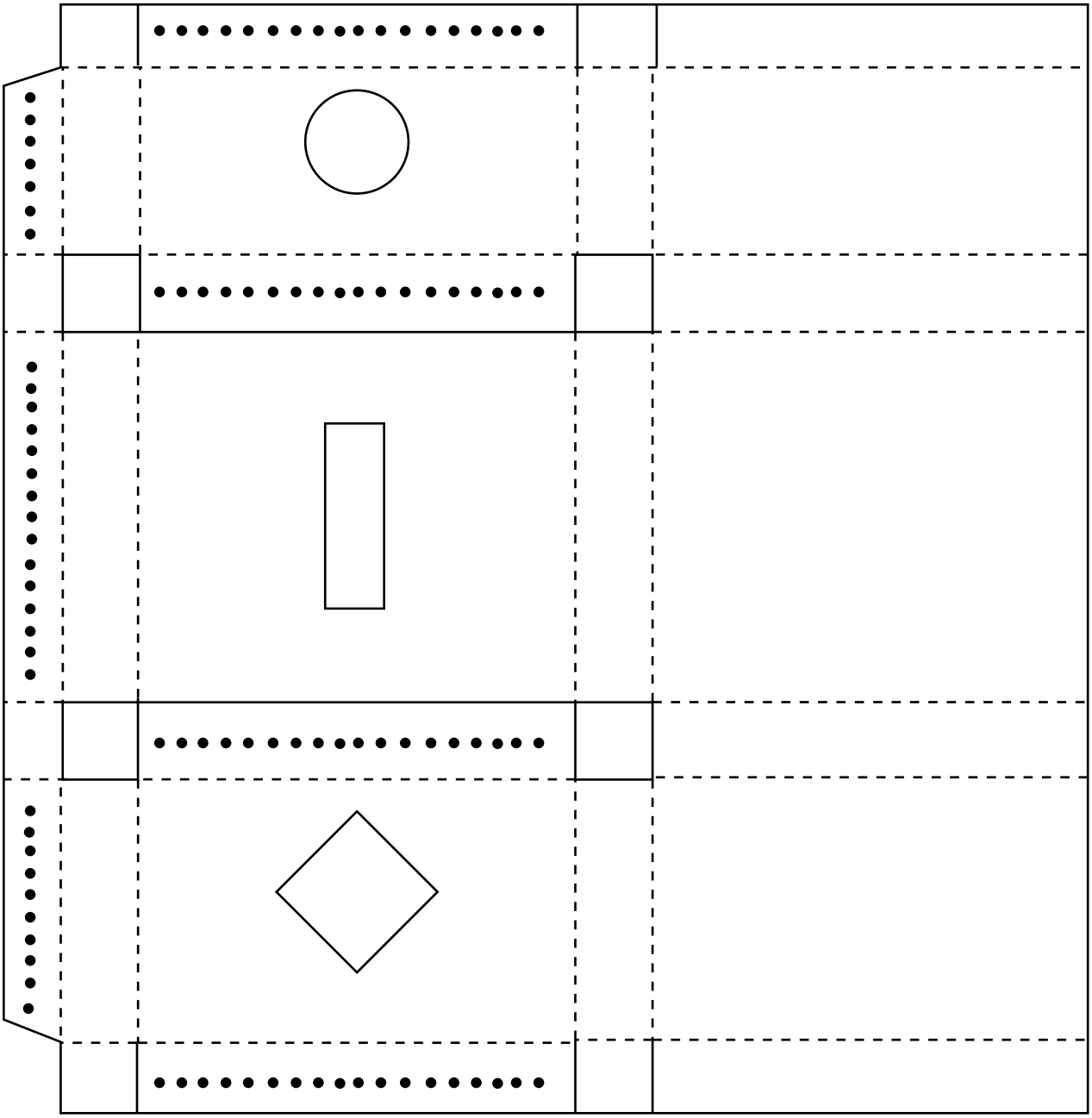


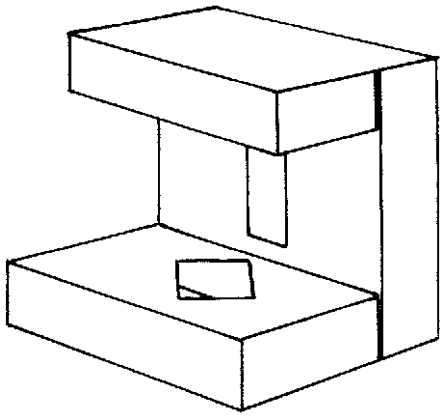


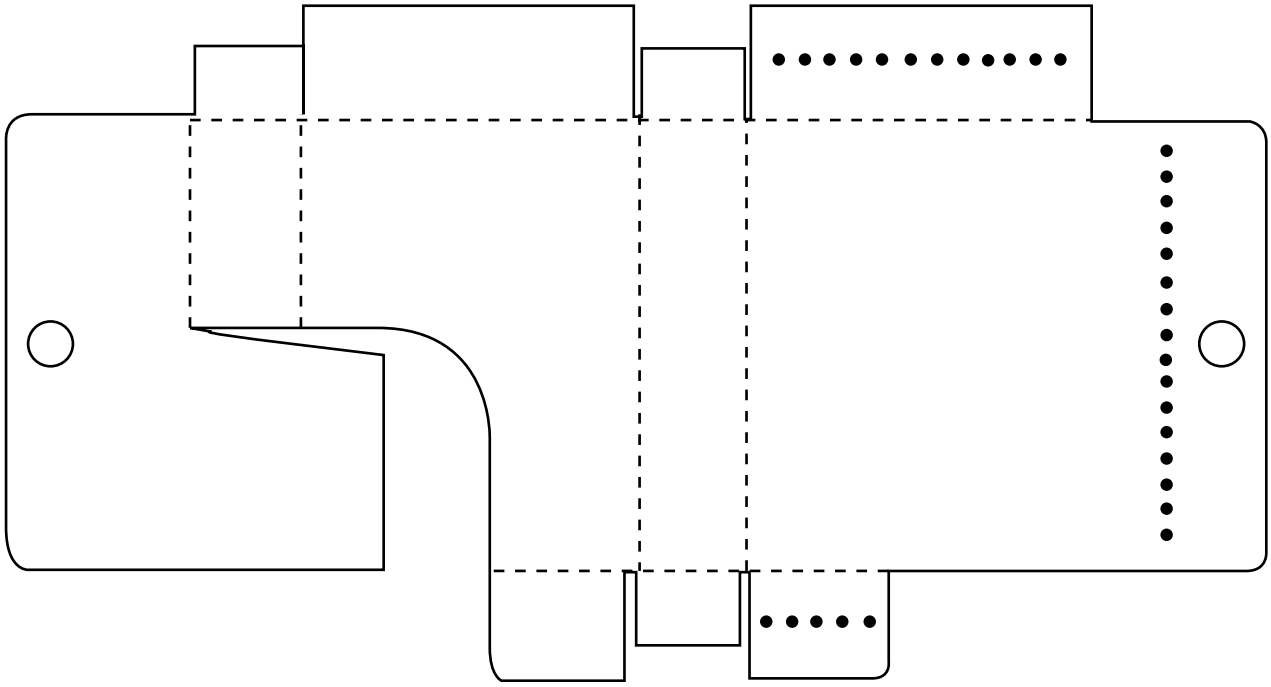


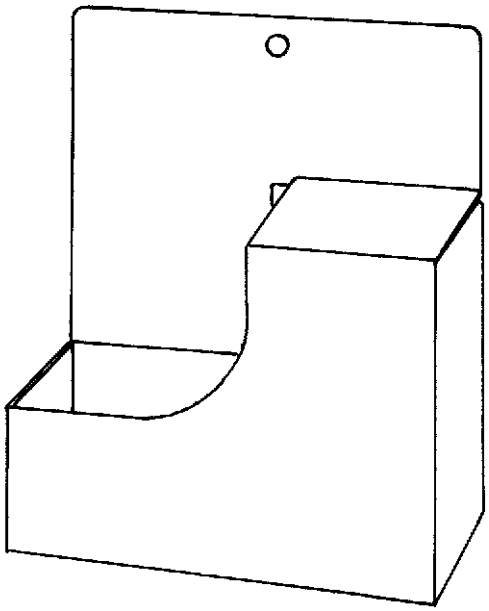


ONE-PIECE OPEN-VIEW DISPLAY CARTON

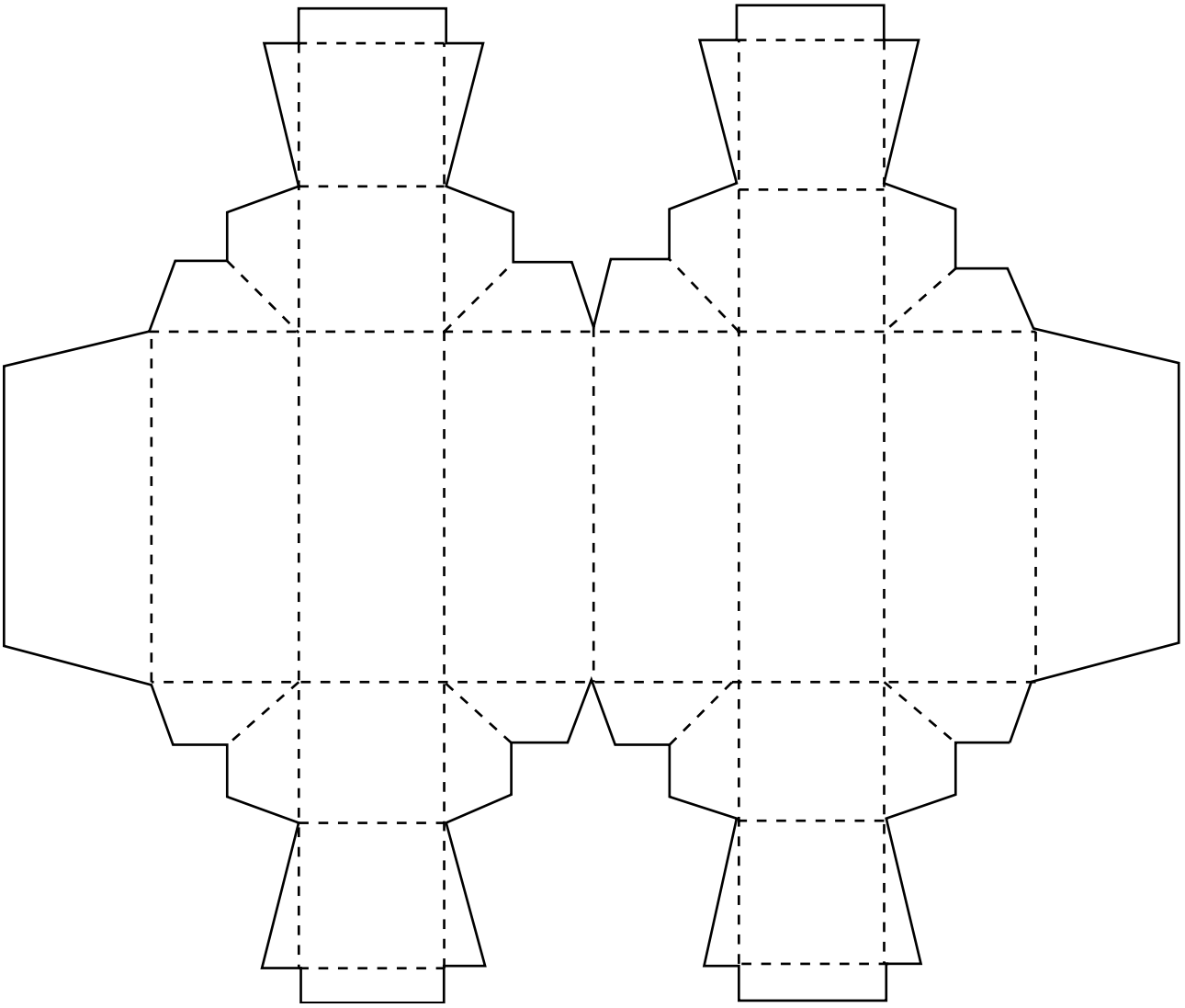


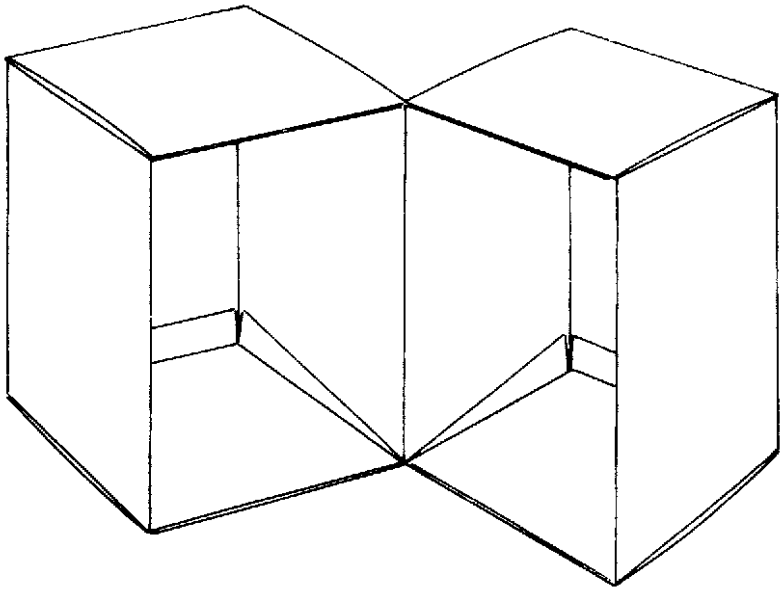


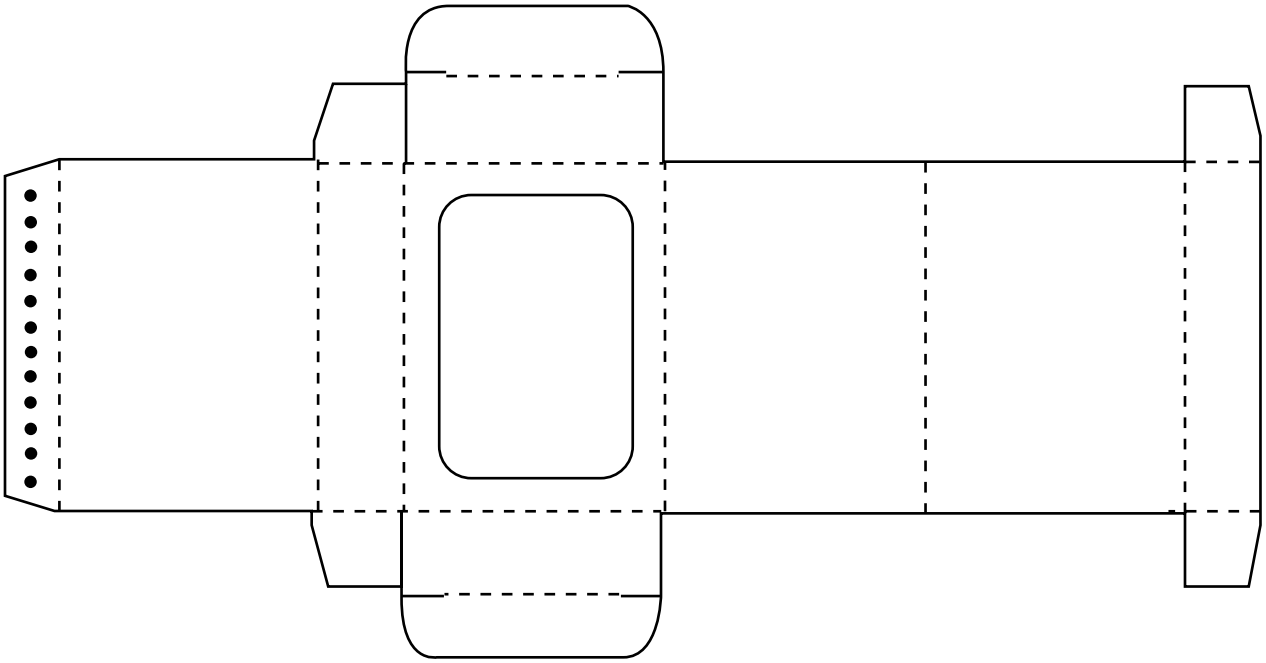


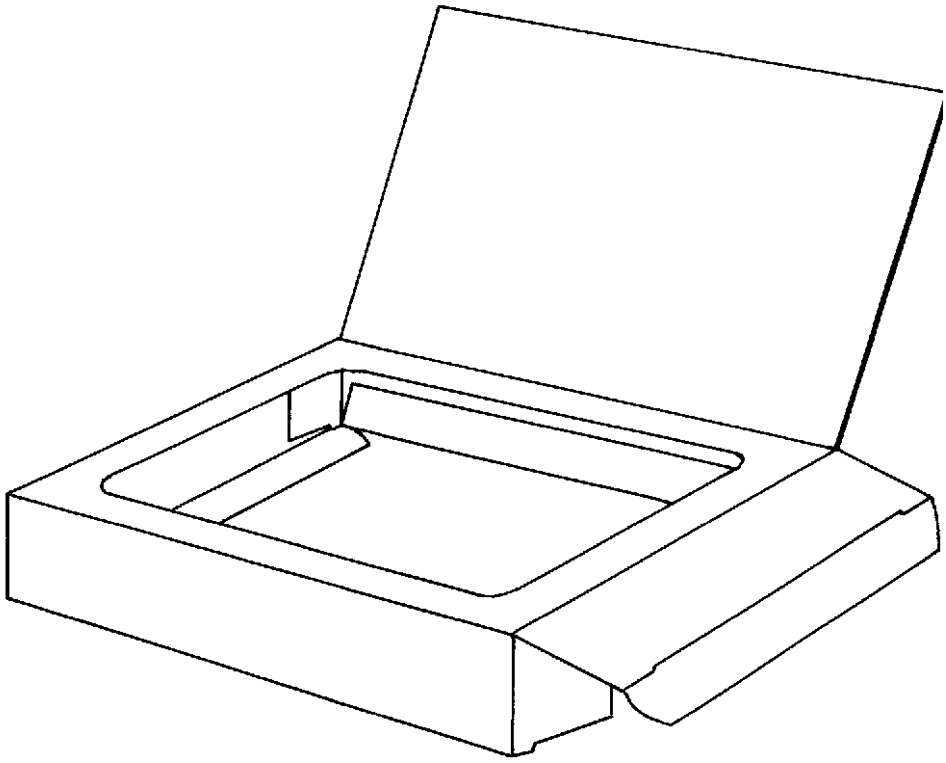


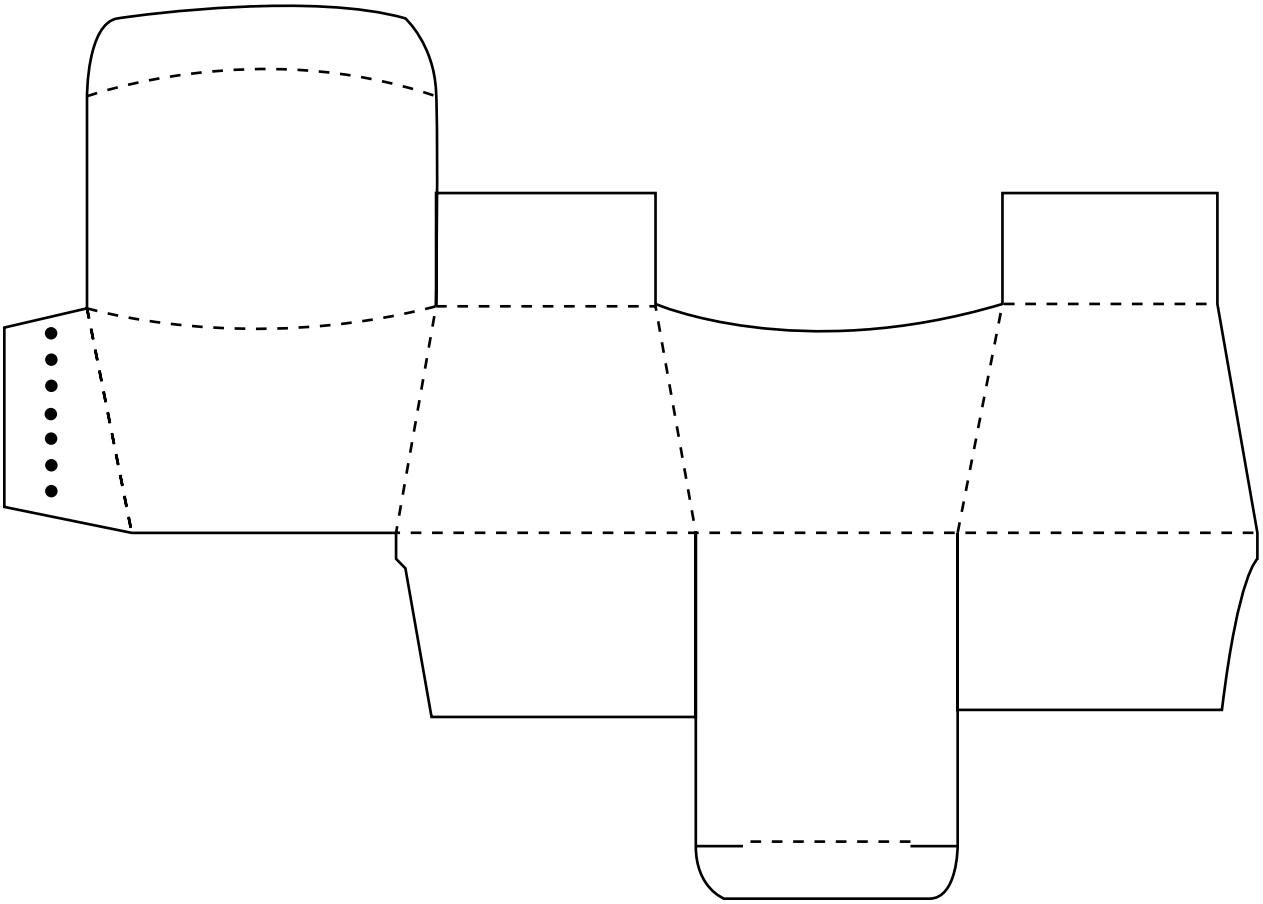
ONE-PIECE SHADOW BOX

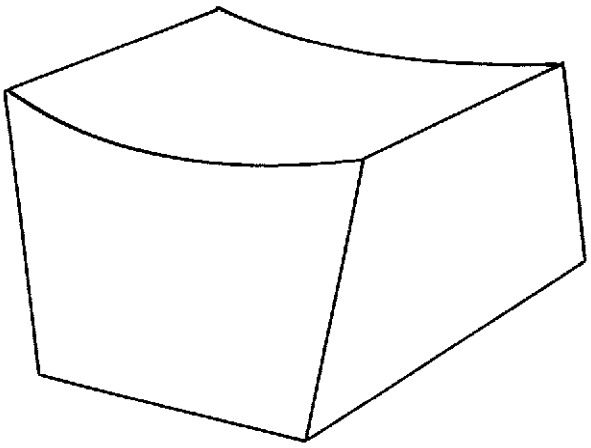




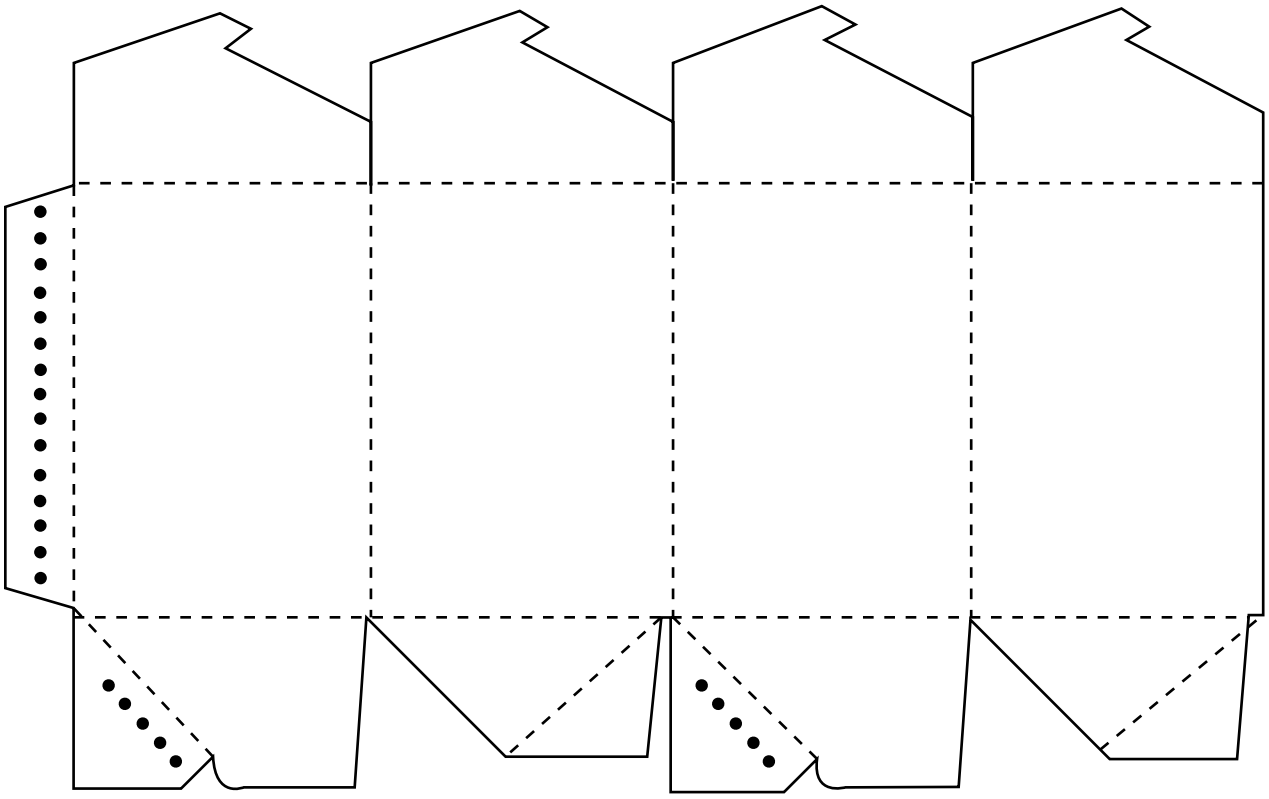


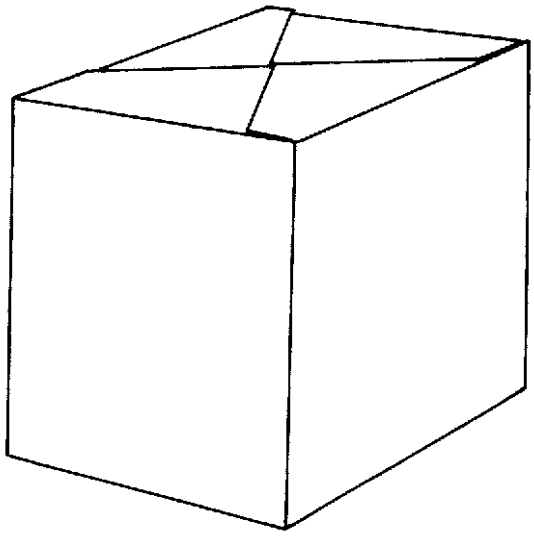




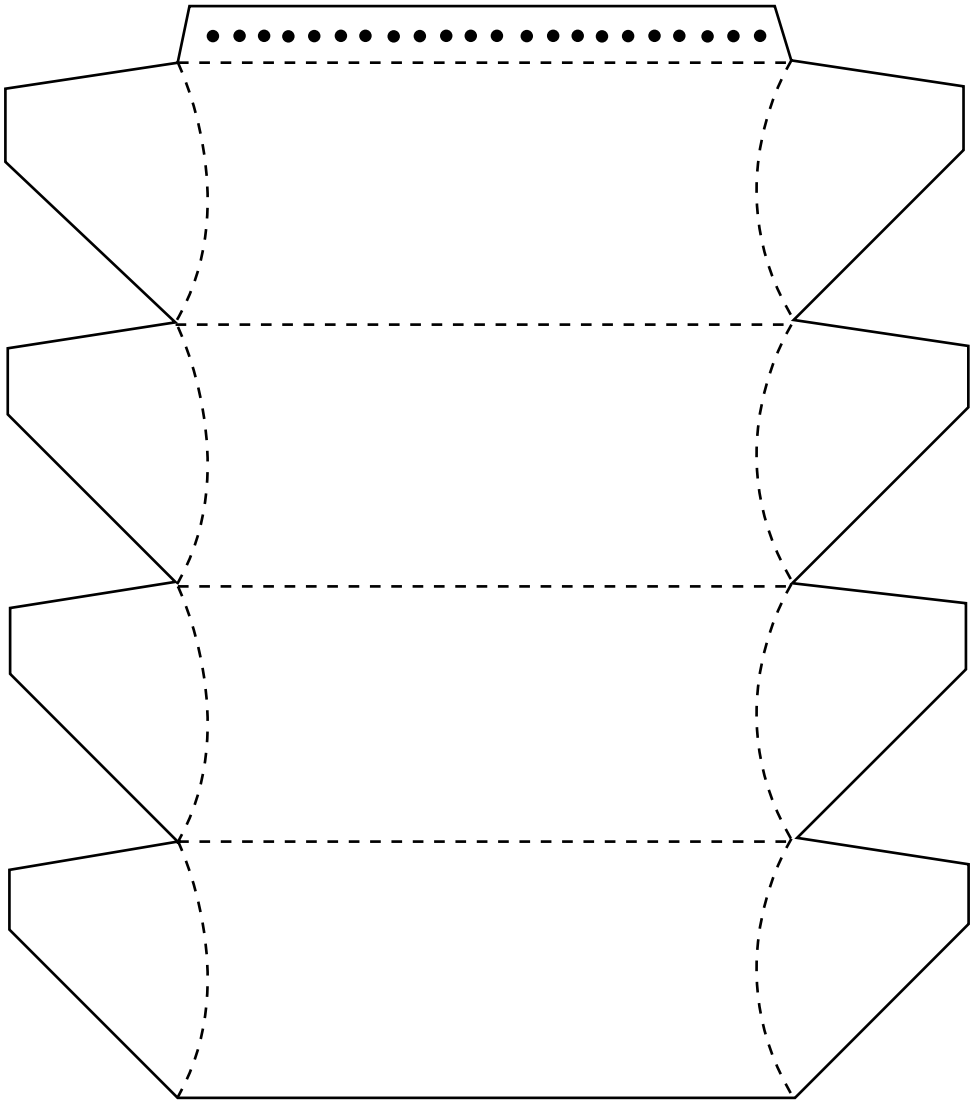


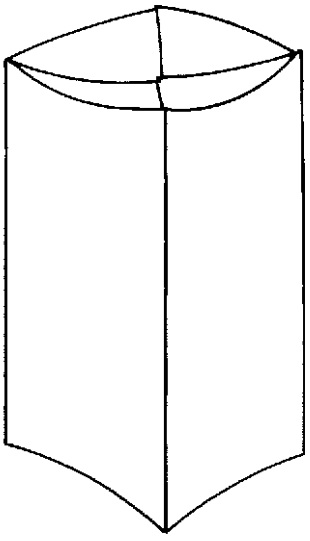
The special effect is created by the concave top and convex front or face panel.



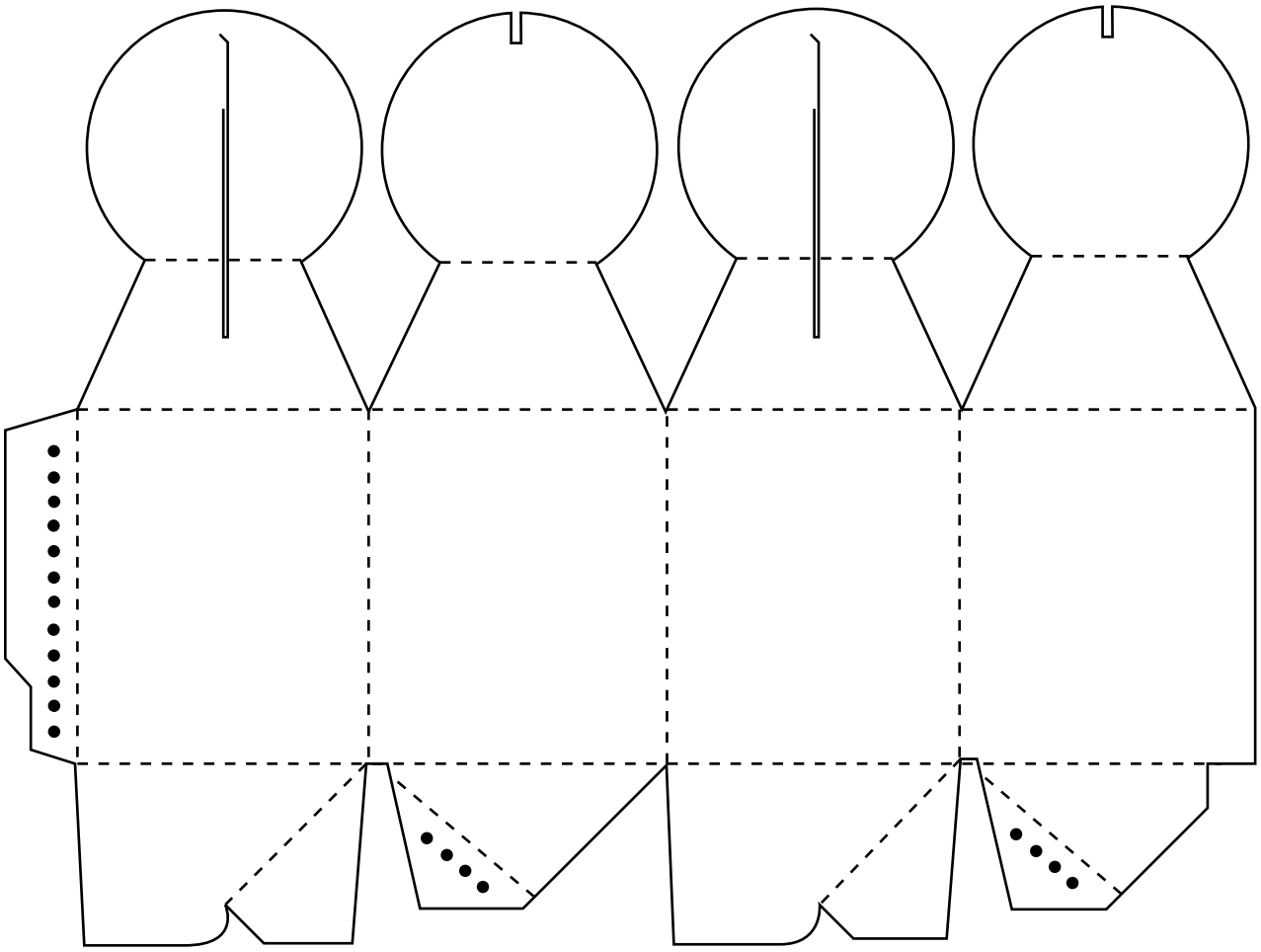


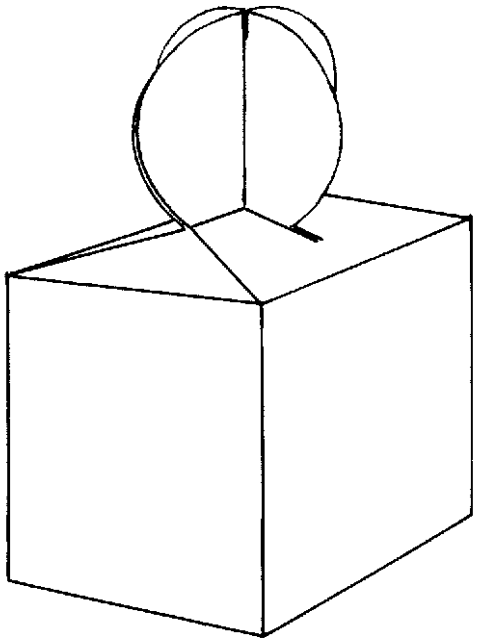
Alternating closure creates an interesting graphic effect that may be enhanced with color.



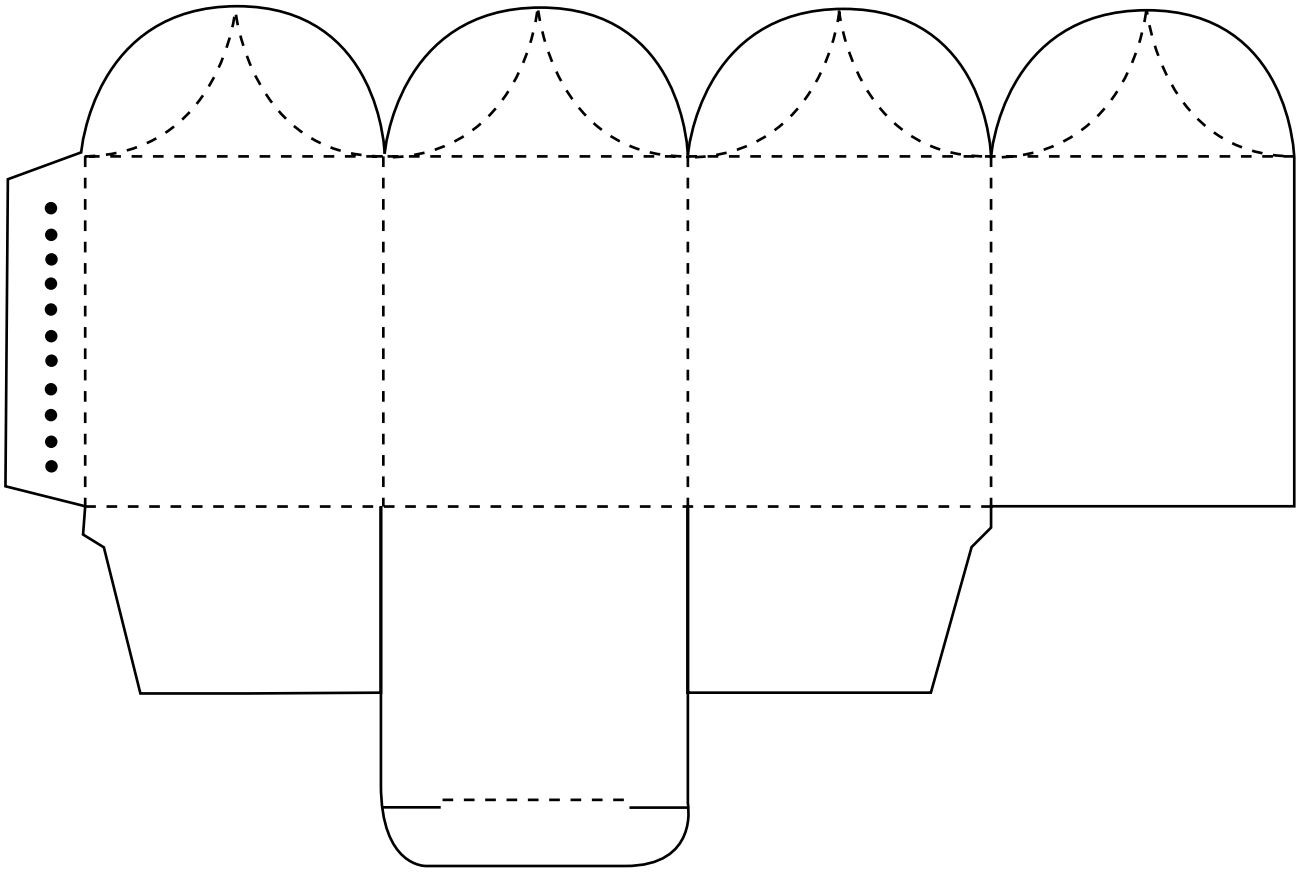


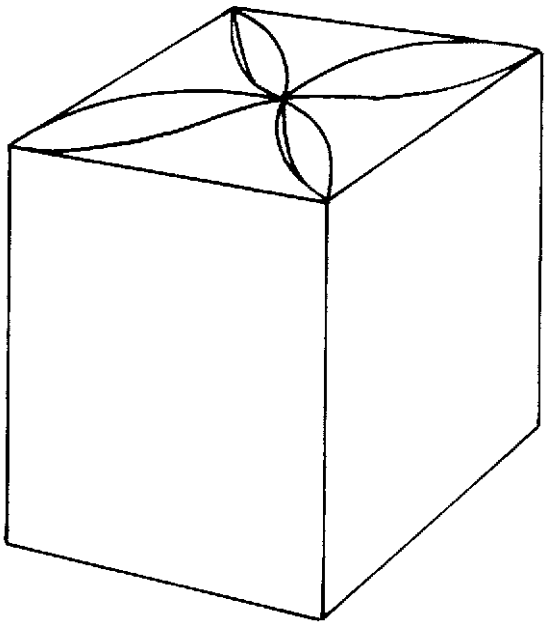
The curved scores on this pattern create a concave top and bottom and convex front, side, and back panels. The tension of the scores keeps both top and bottom close.





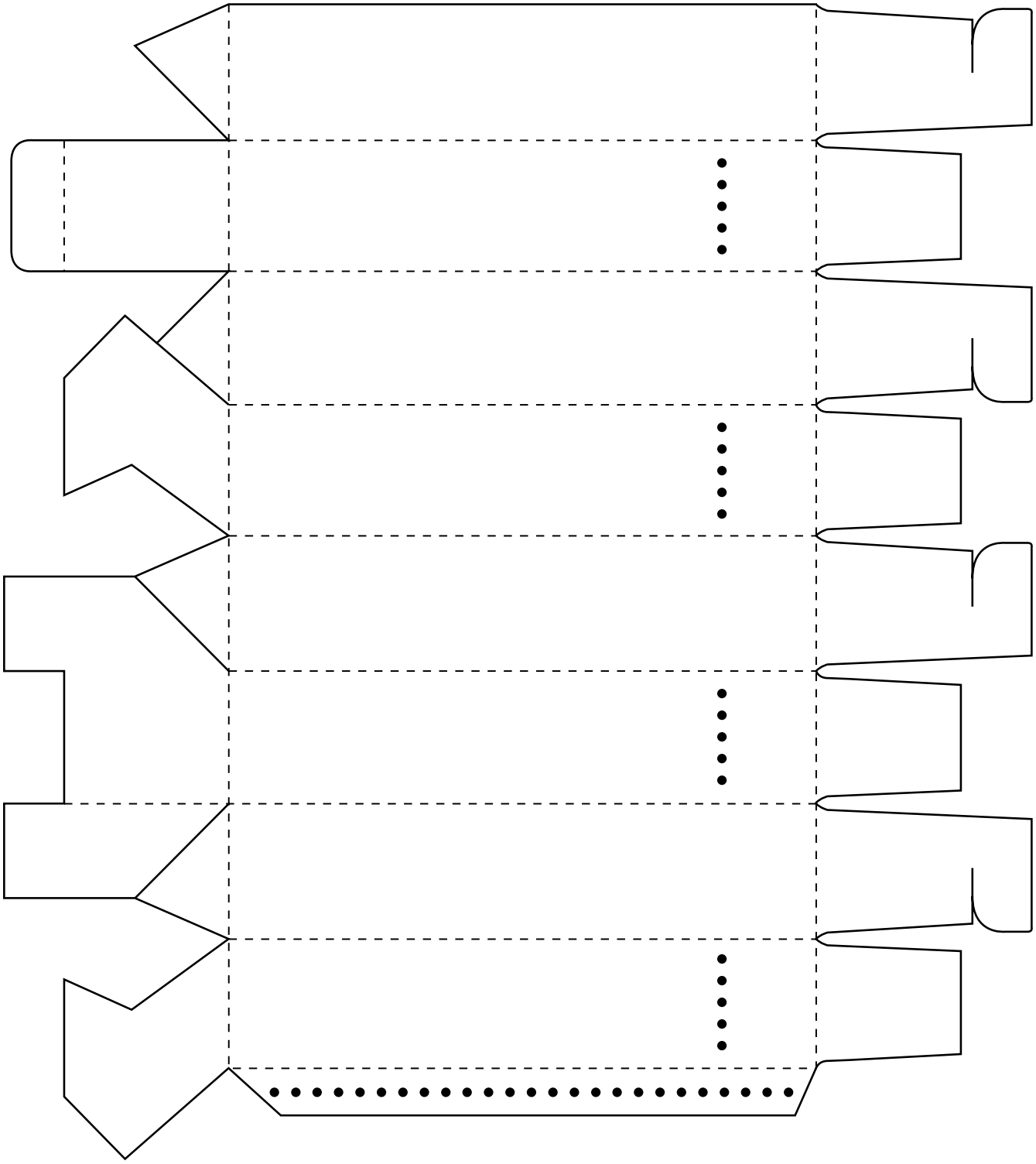
Specialty closure on top panels gives free rein to many graphic solutions.



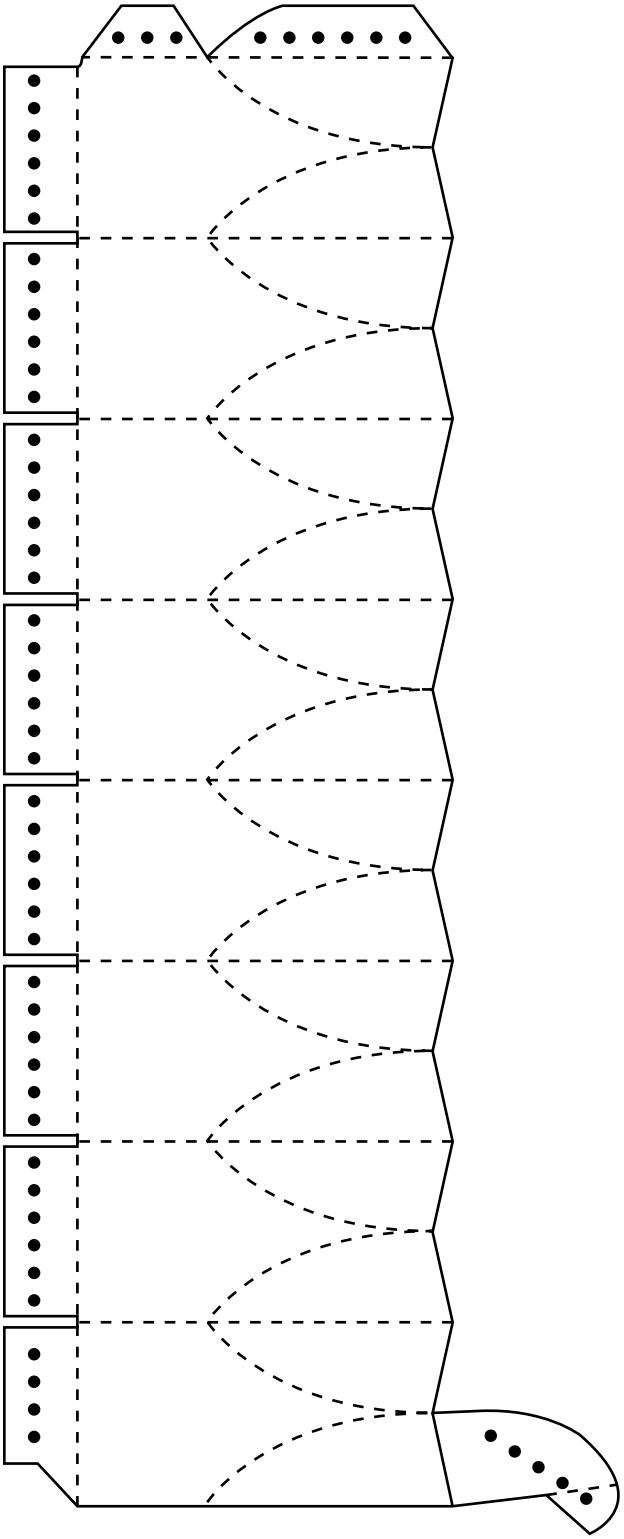


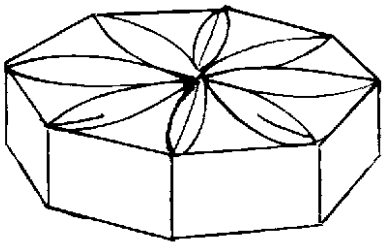
Specially shaped top closure creates an interesting concave/convex interplay.

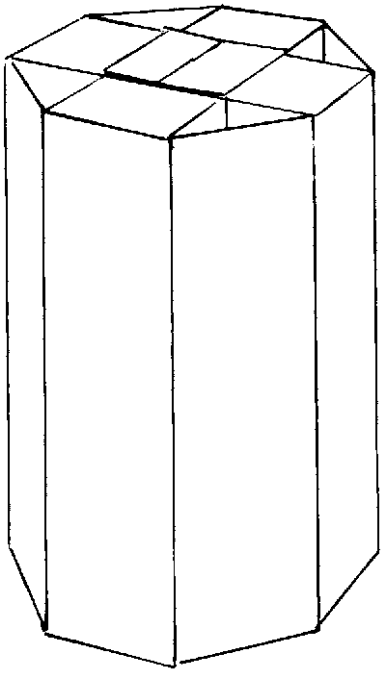
OCTAGON WITH AUTO-LOCK BOTTOM

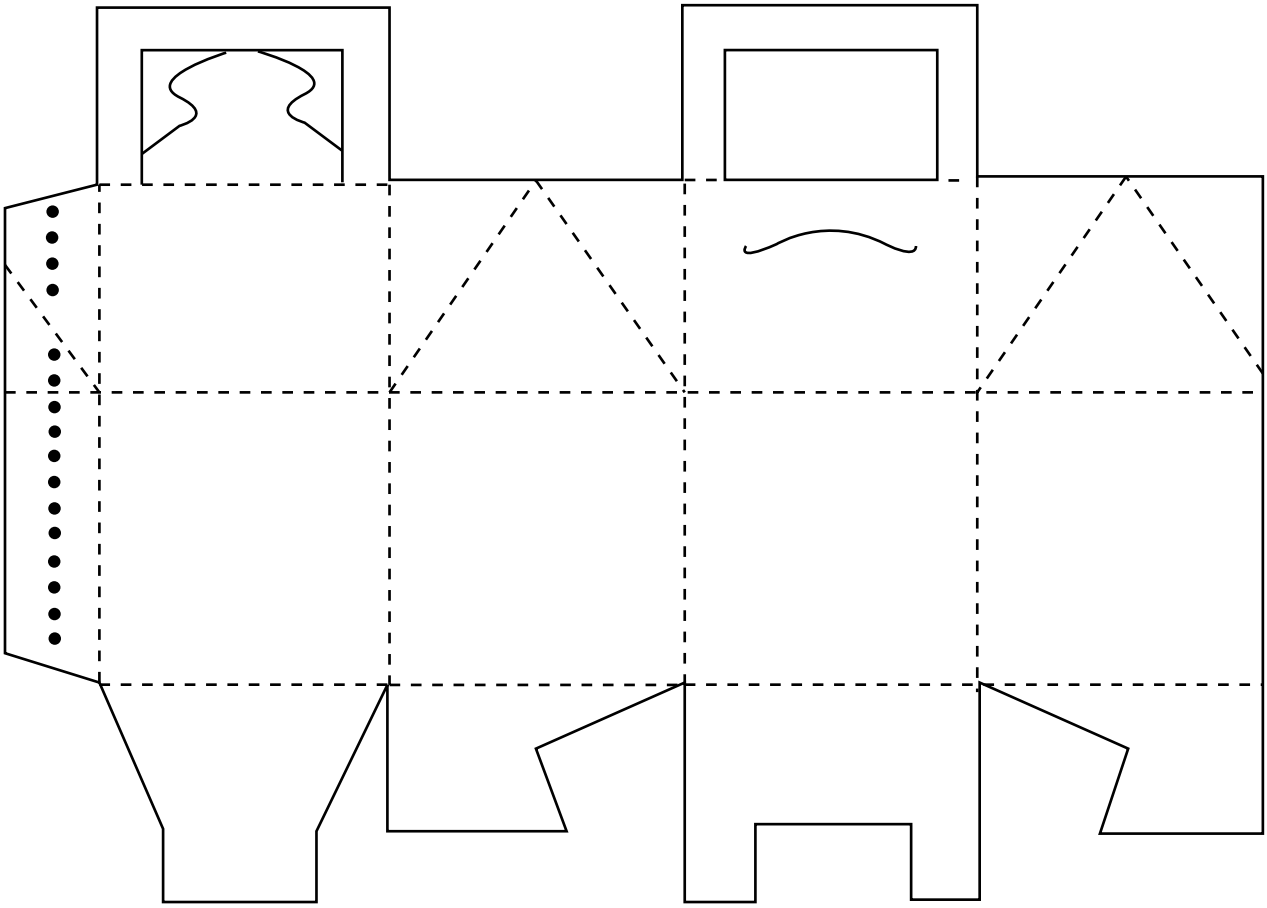


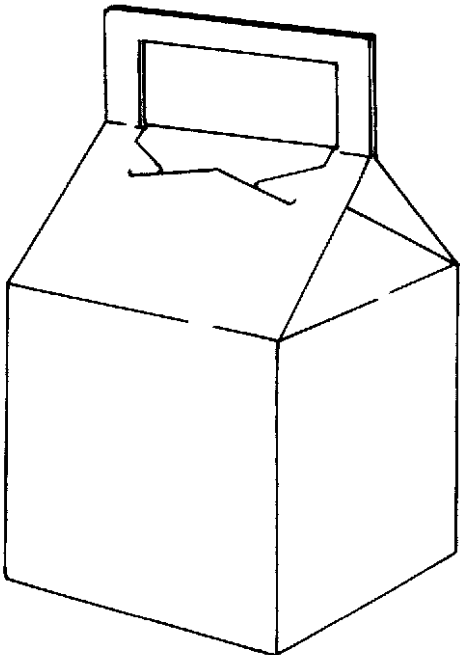
Combined with the decorative top on the following page, this makes a handsome package with many graphic design possibilities.



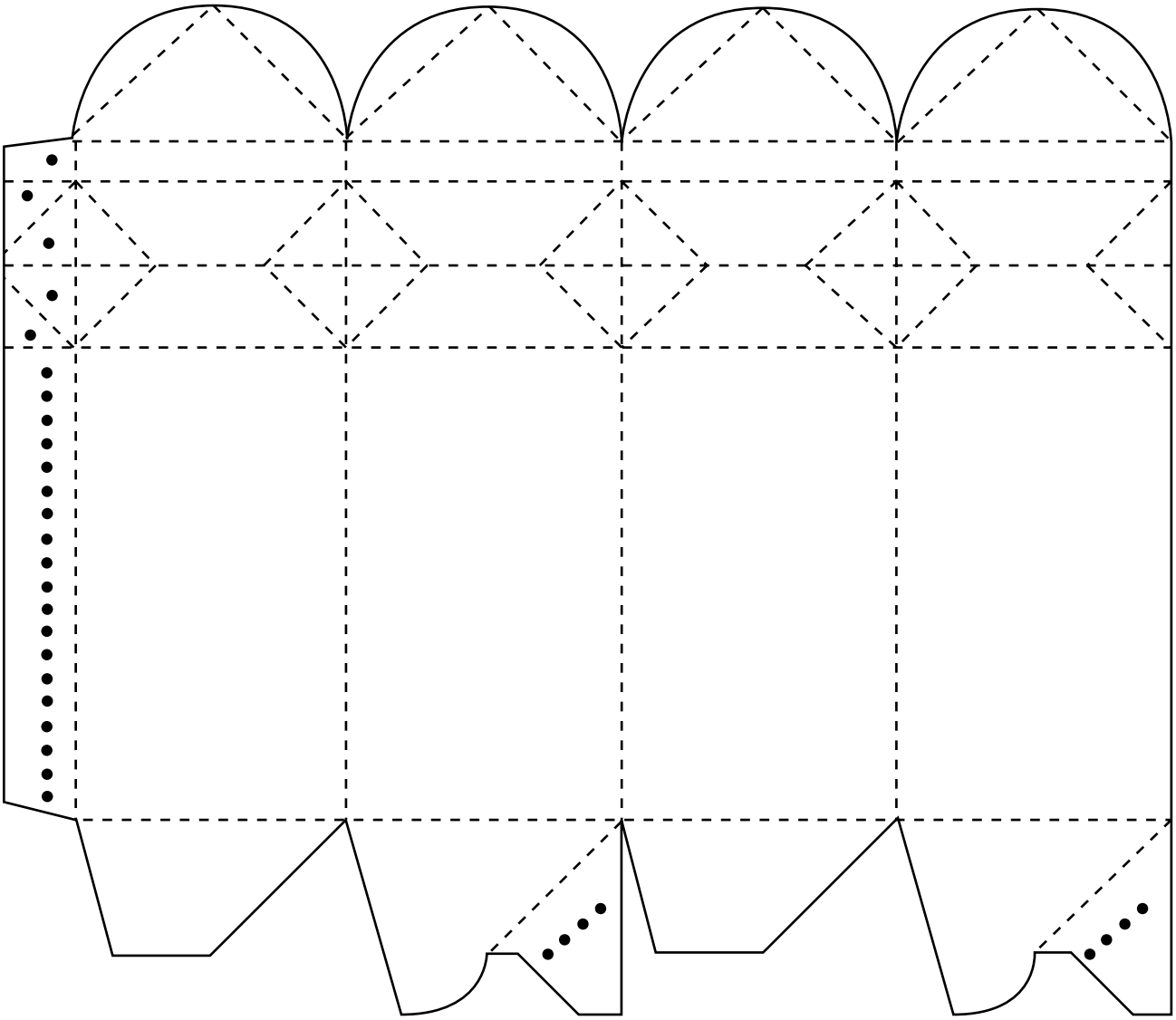


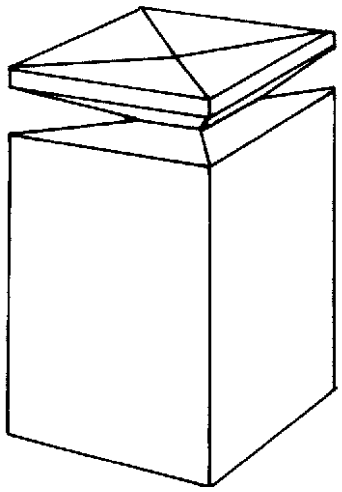






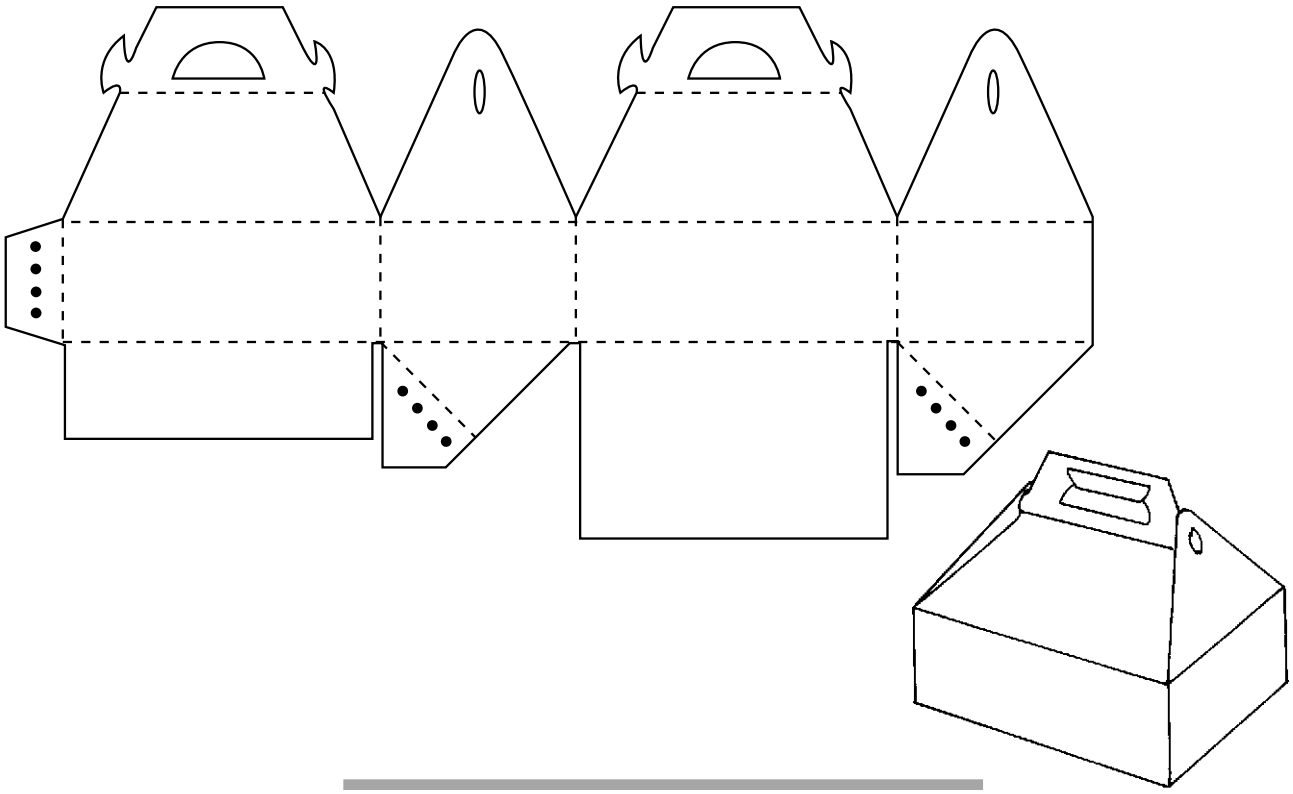
ACCORDION-STYLE CLOSURE



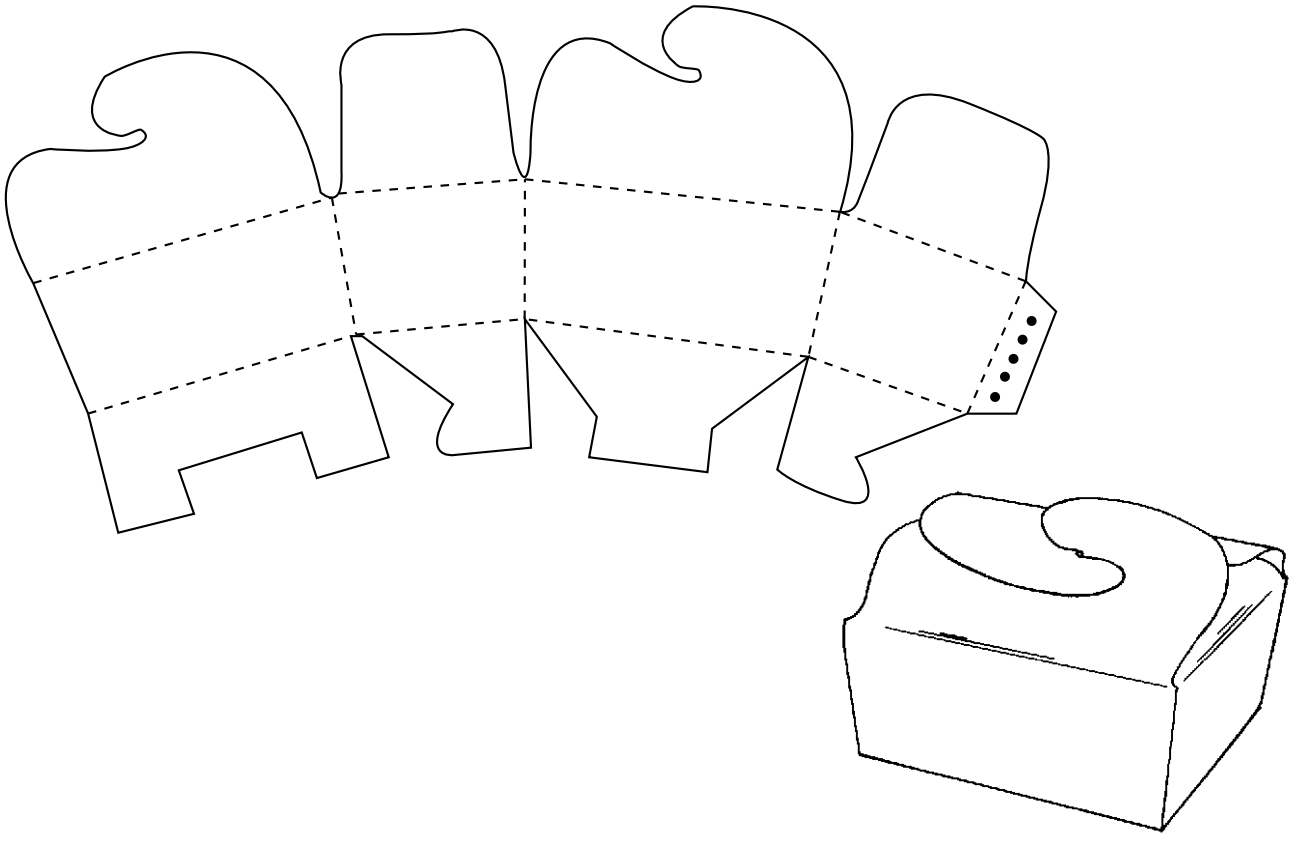


Scored front, back, and side panels lend themselves to cord or ribbon decoration.

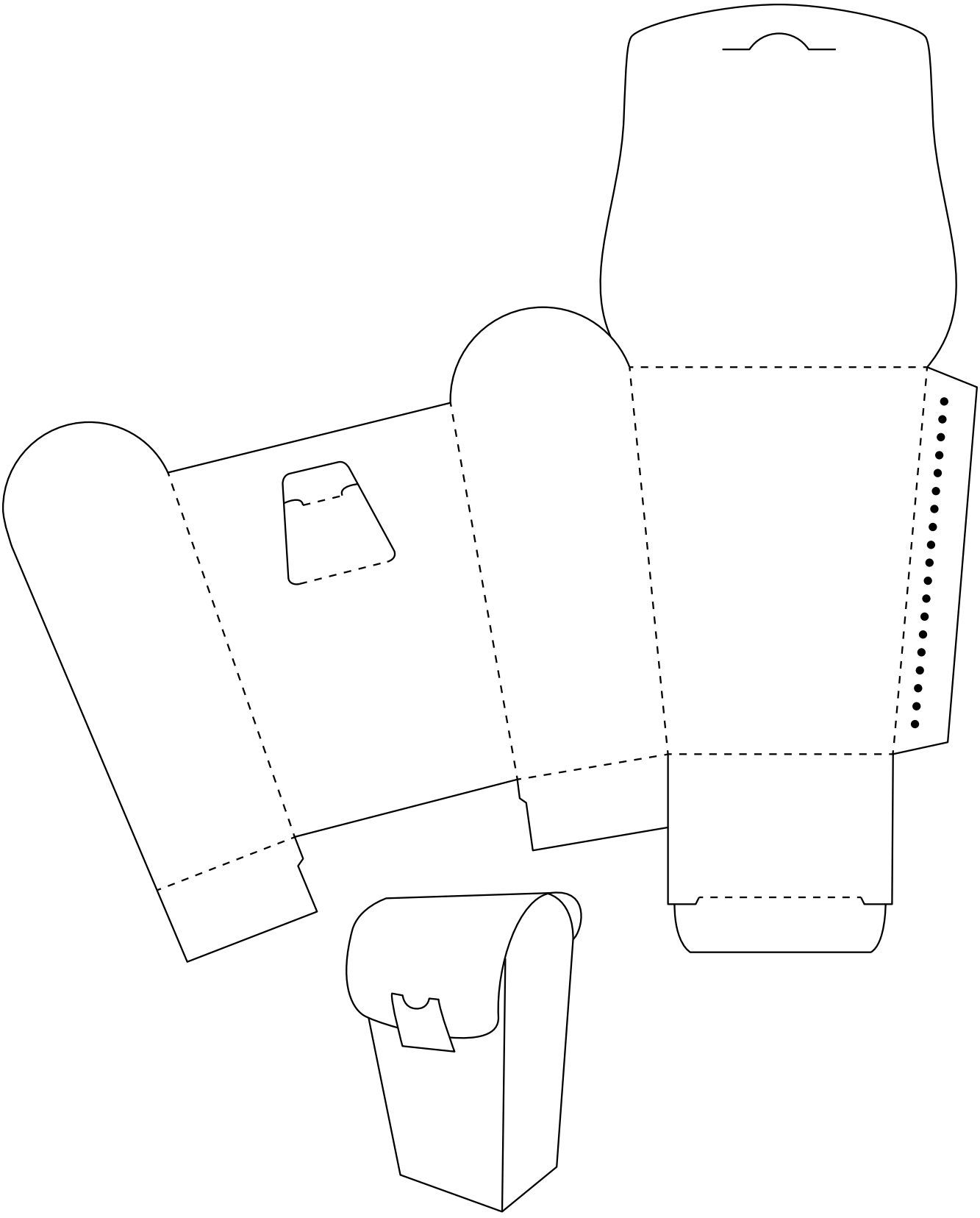
FULL-FLAP AUTOMATIC BOTTOM, TAPERED TOP WITH LOCK TABS AND CARRYING HANDLE



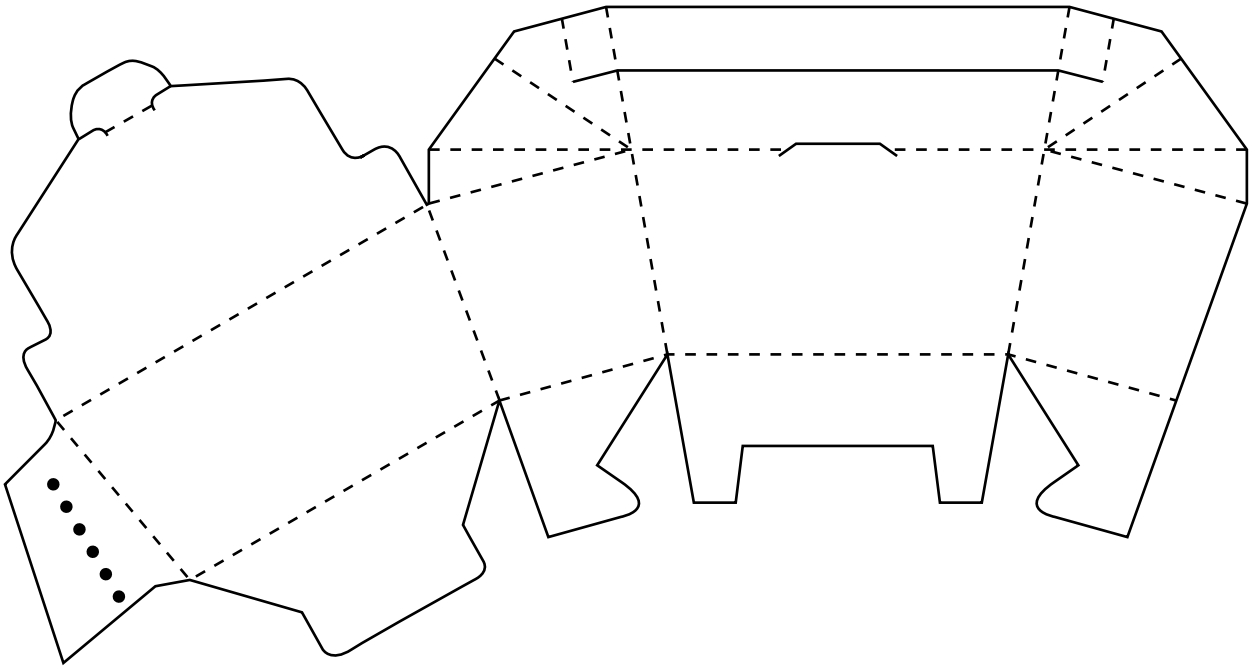
HOOK-TAB CLOSURE WITH TAPERED SIDES

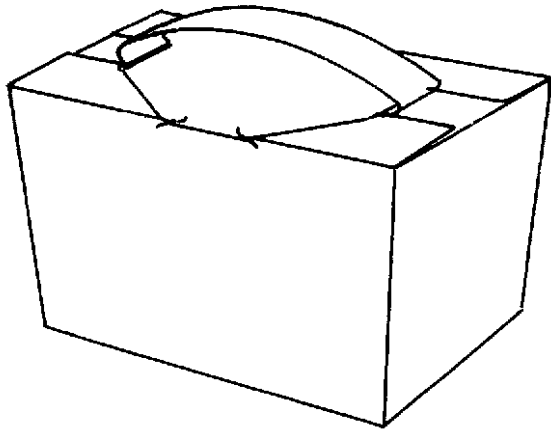


TAPERED BOX WITH ROLLED END CLOSURE

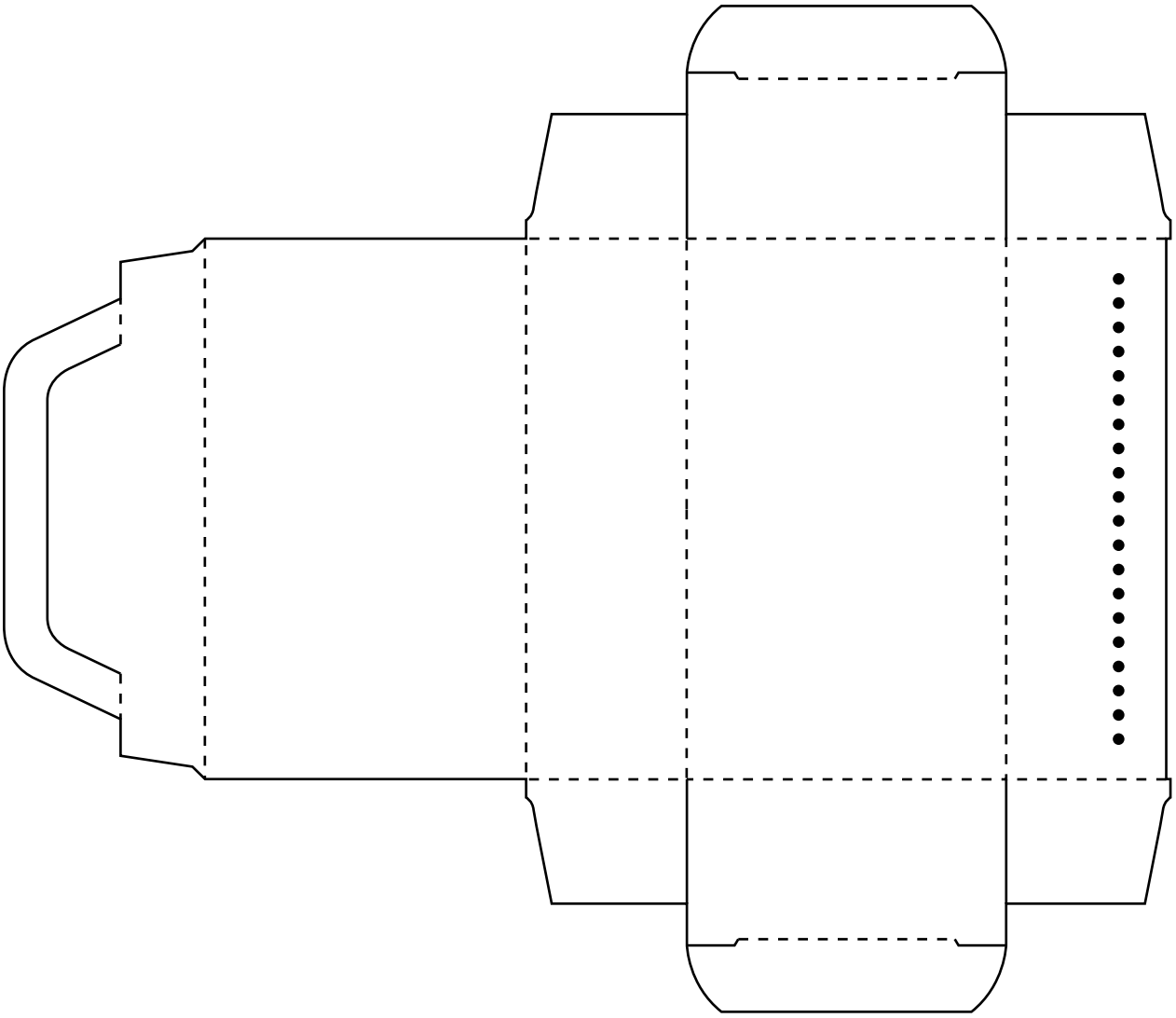


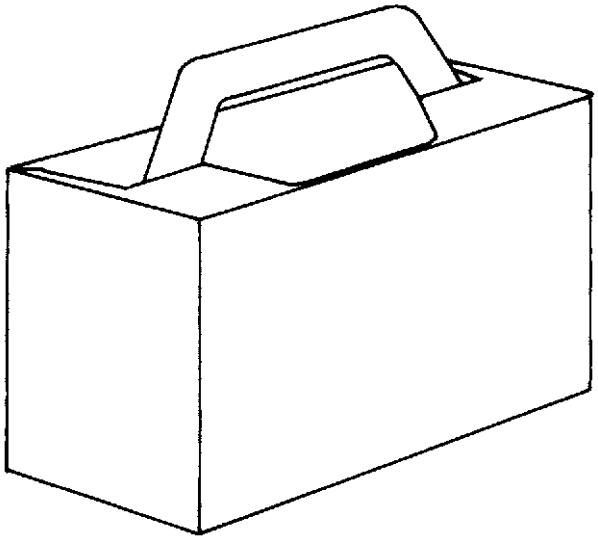
TAPERED SIDES, 1-2-3 BOTTOM TONGUE LOCK, TOP PANEL WITH CENTERED CARRYING HANDLE

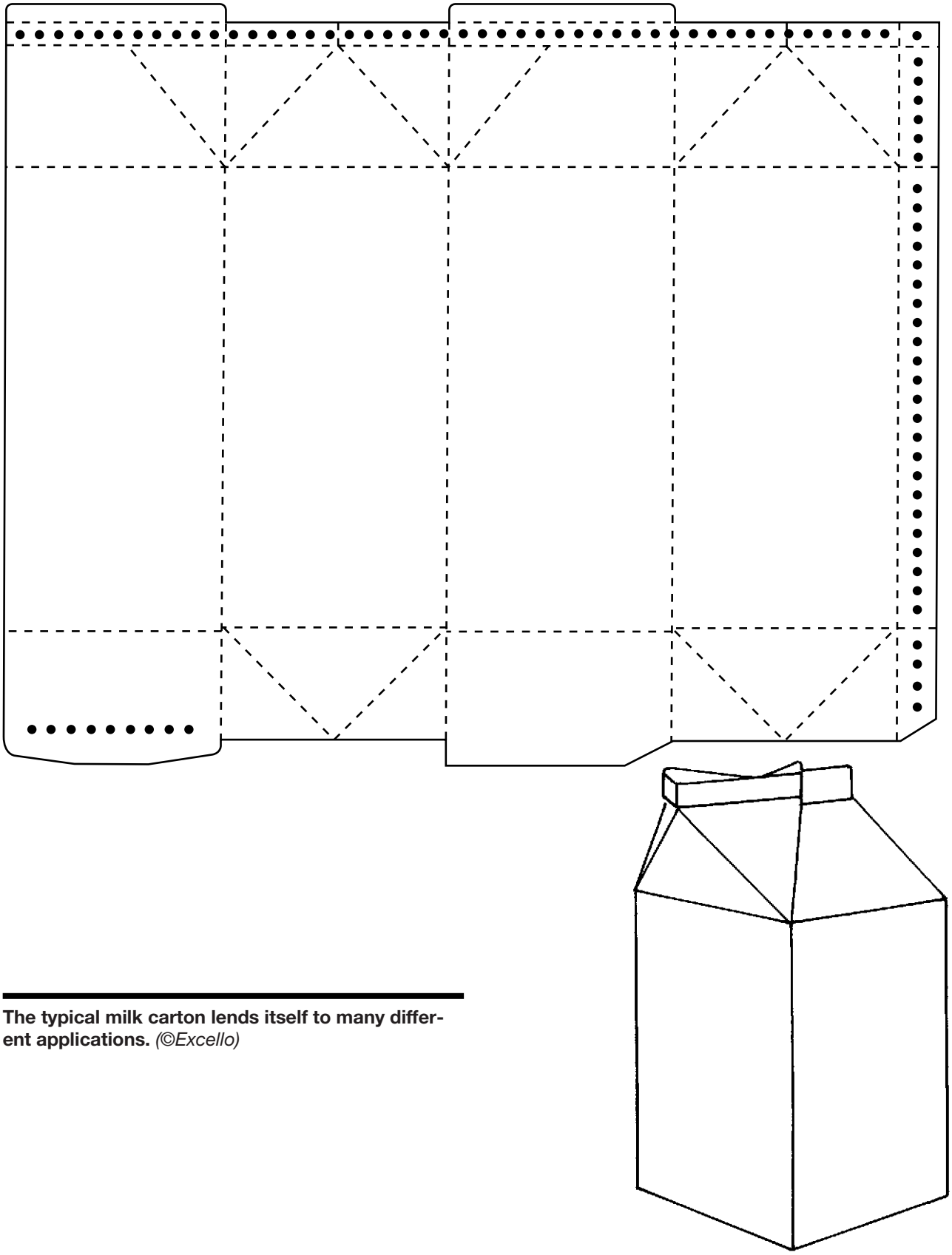




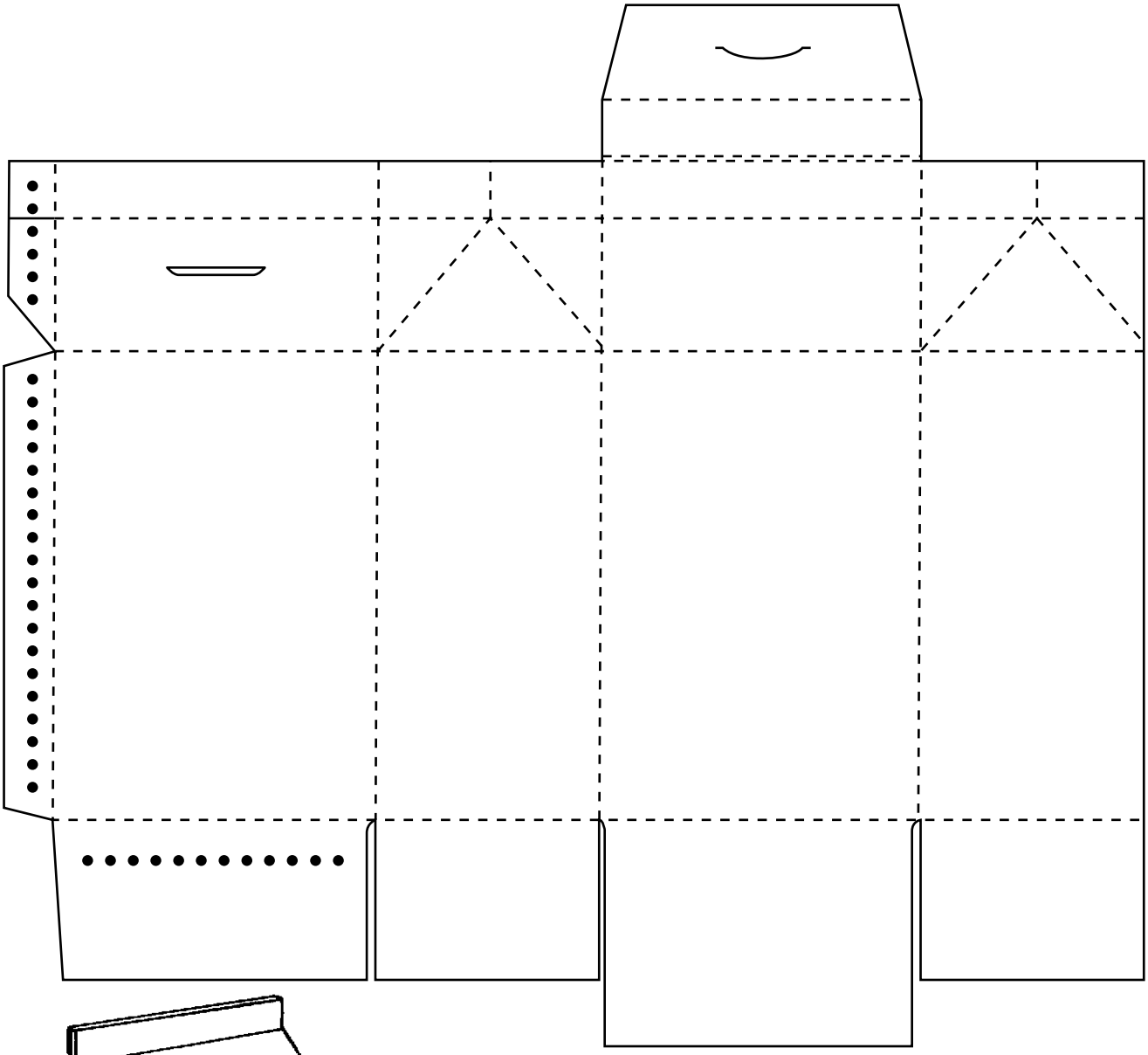
STRAIGHT TUCK WITH CENTERED HANDLE

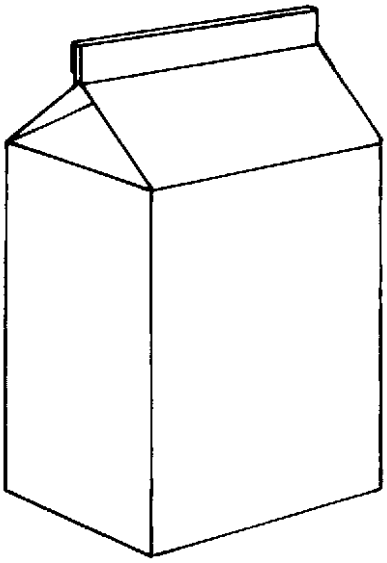




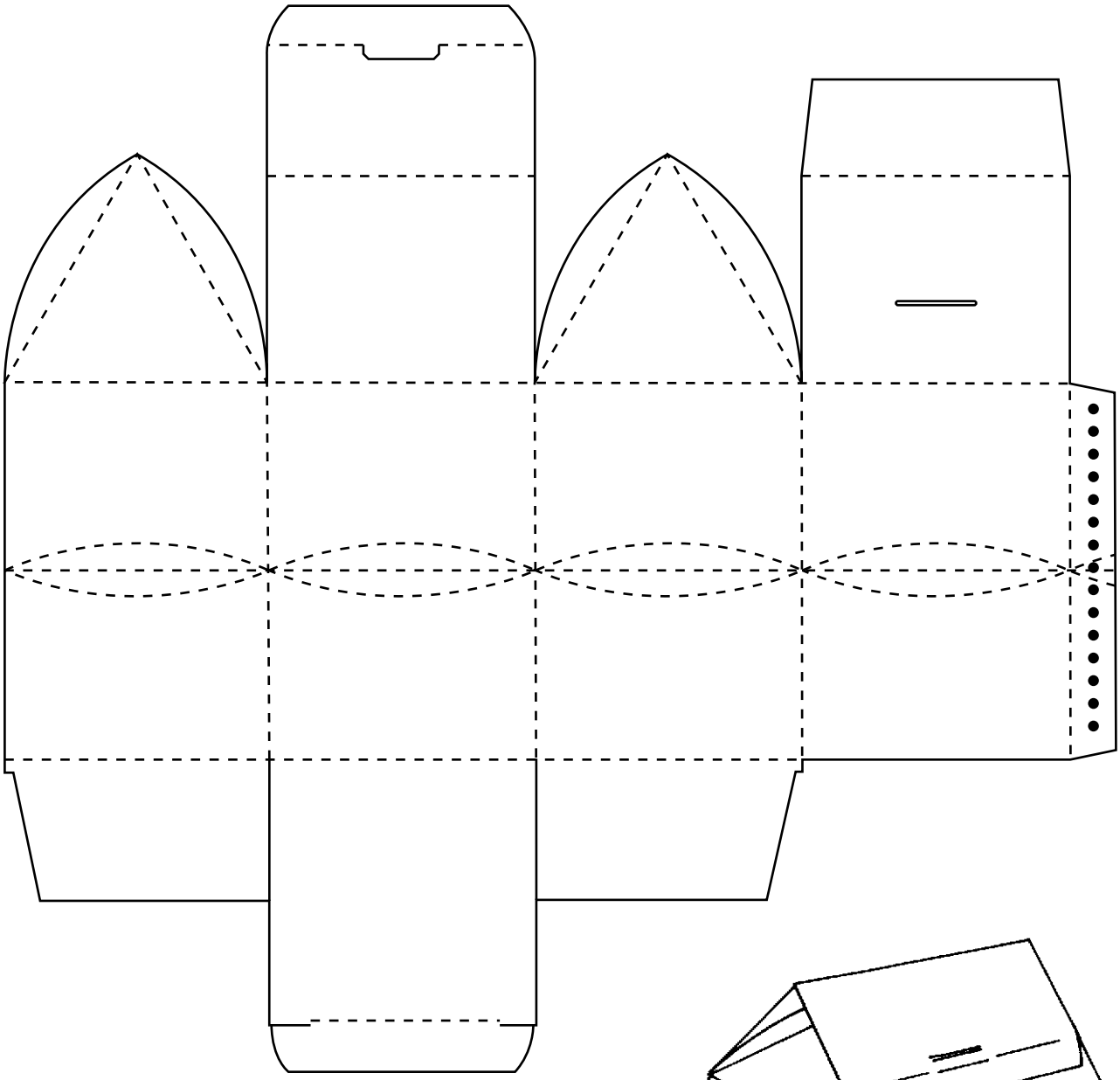


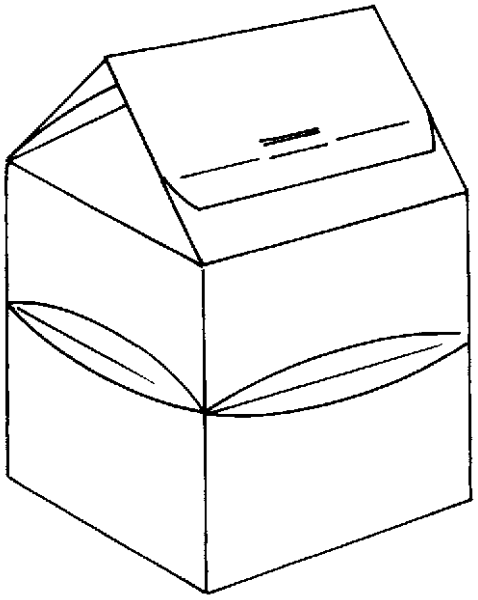
The typical milk carton lends itself to many different applications. *(©Excello)*



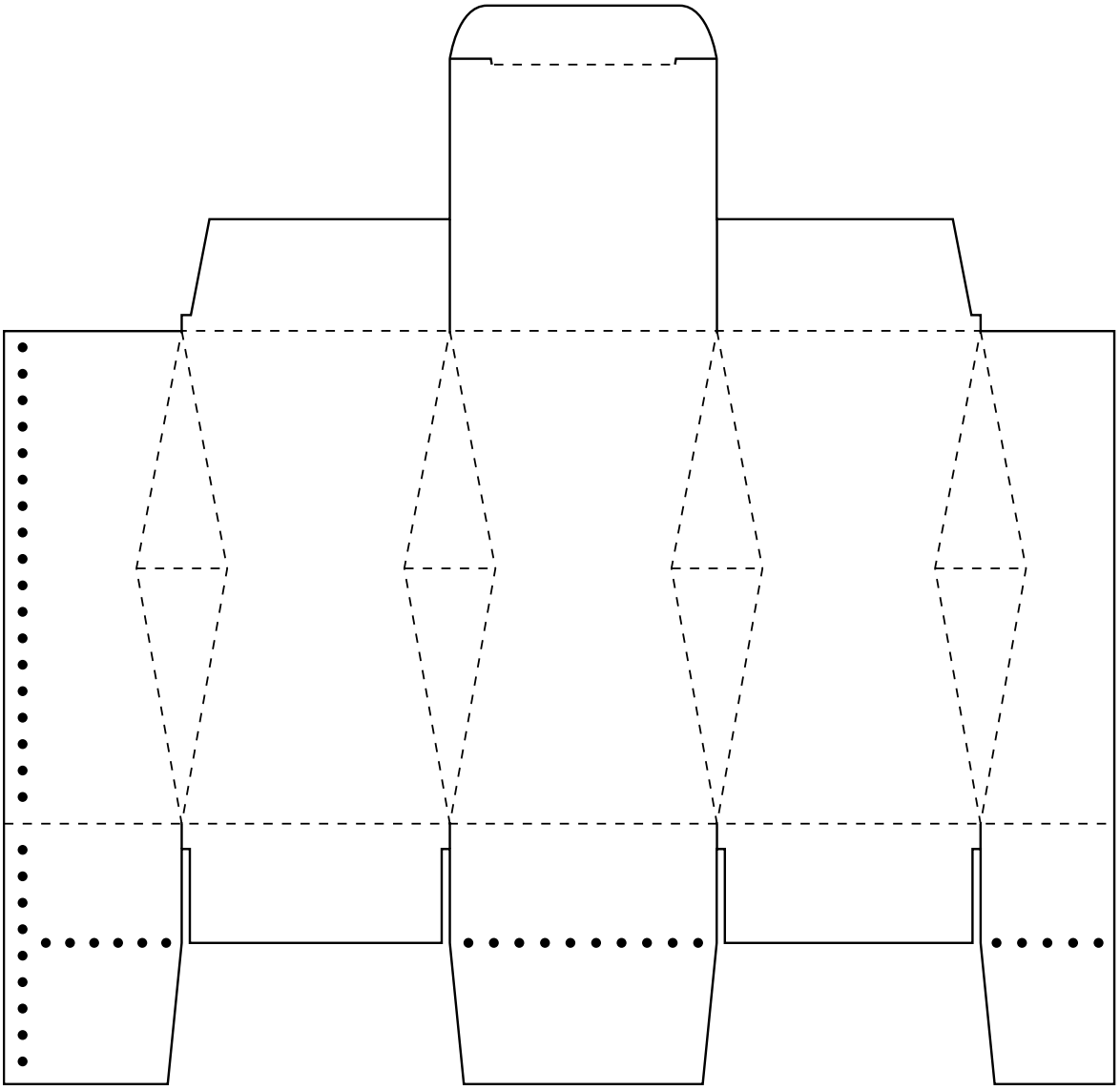


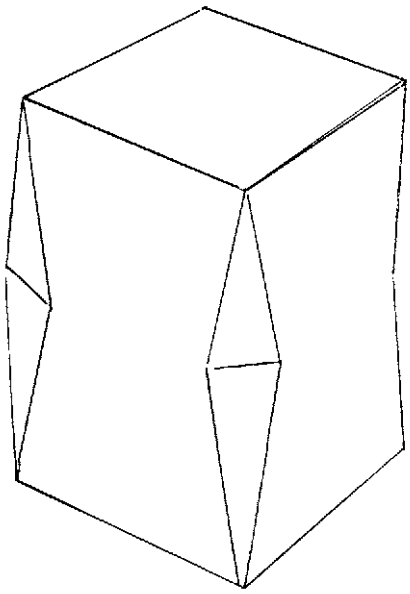
One variation of the milk carton style container has a slit/loop closure.



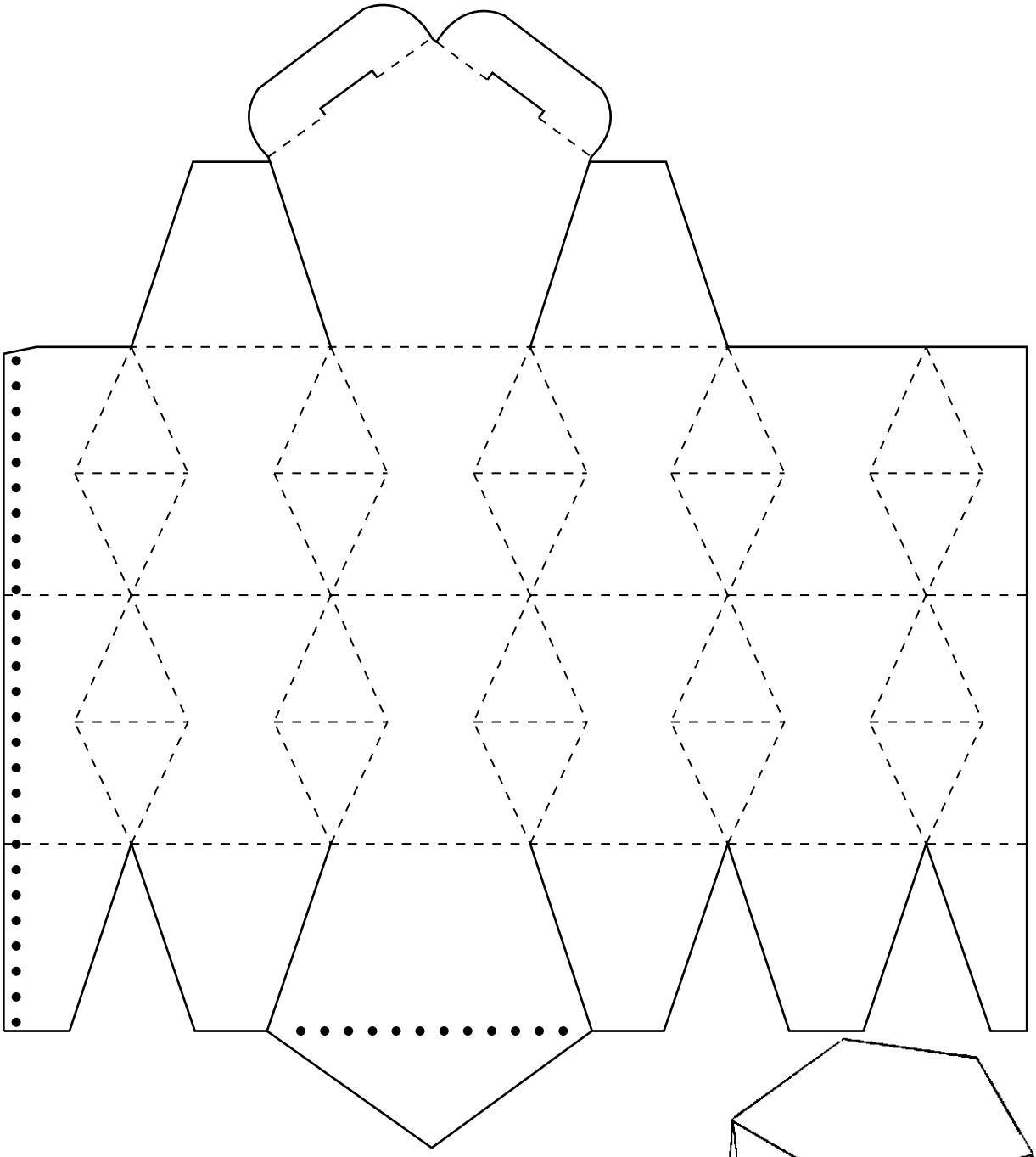


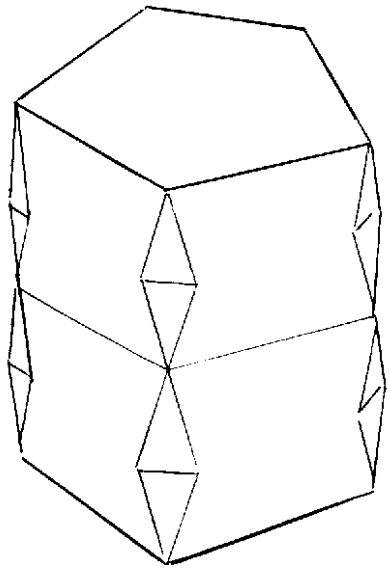
The curvilinear scores in the four riser panels serve as a unique decorative alternative.



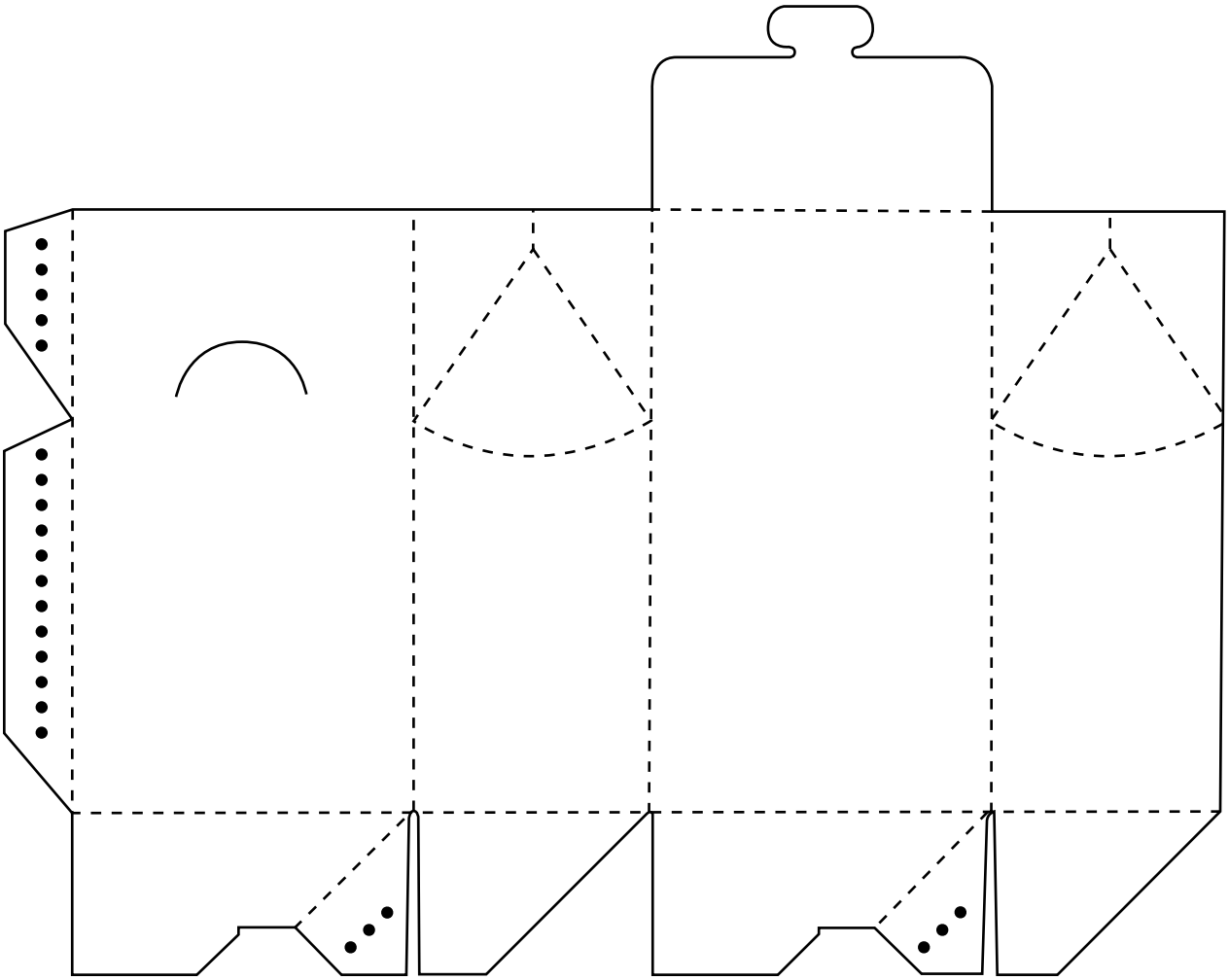


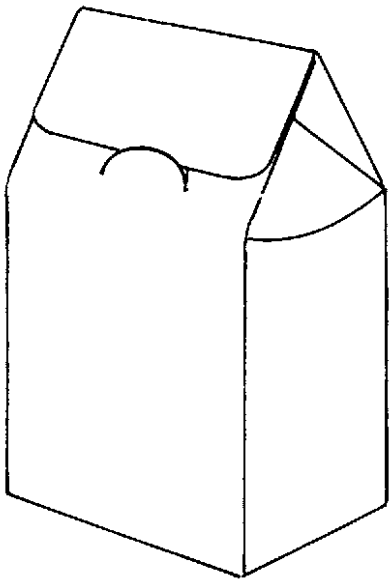
This container and the one on the following page lend themselves to great graphic applications.



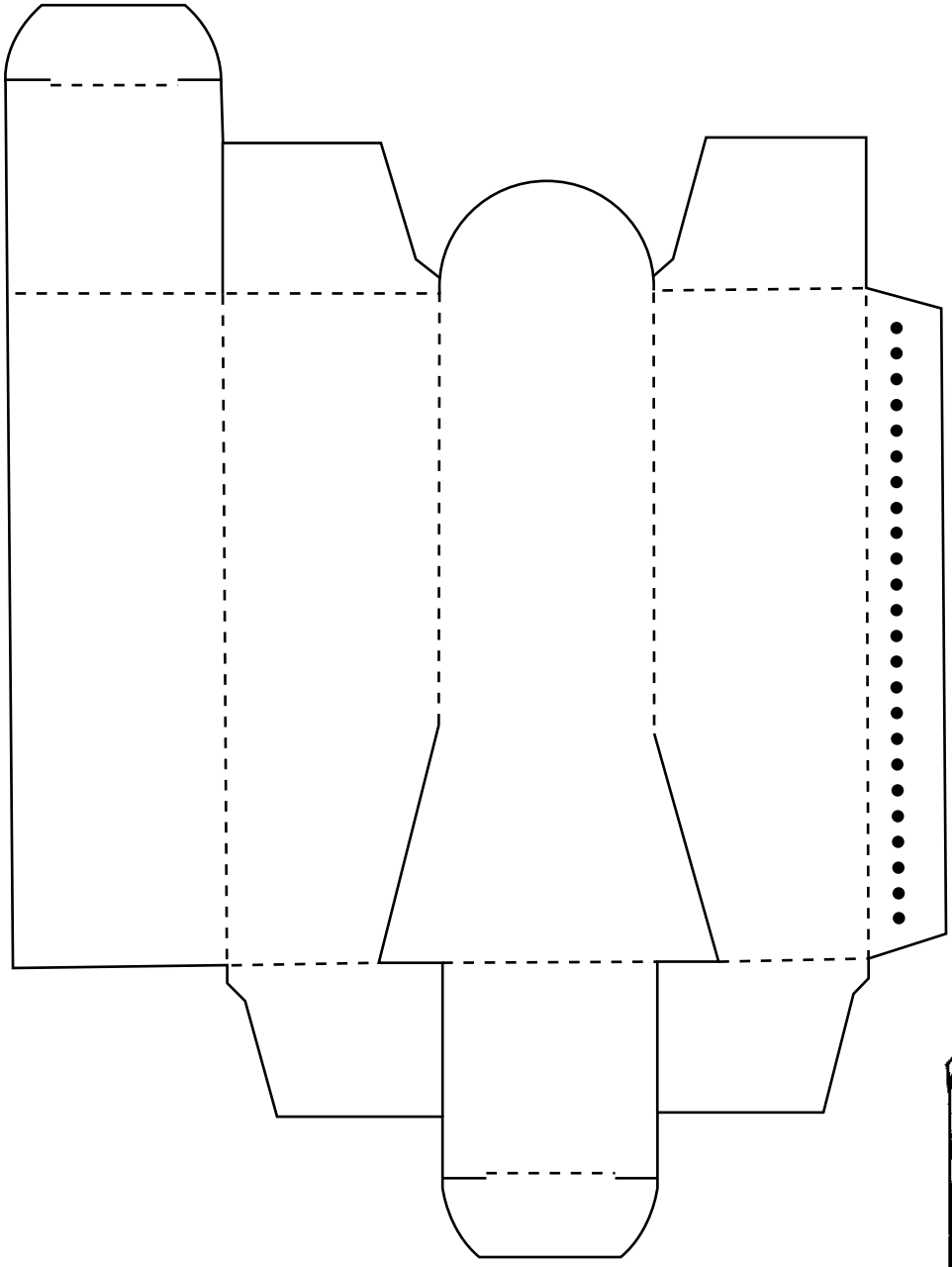


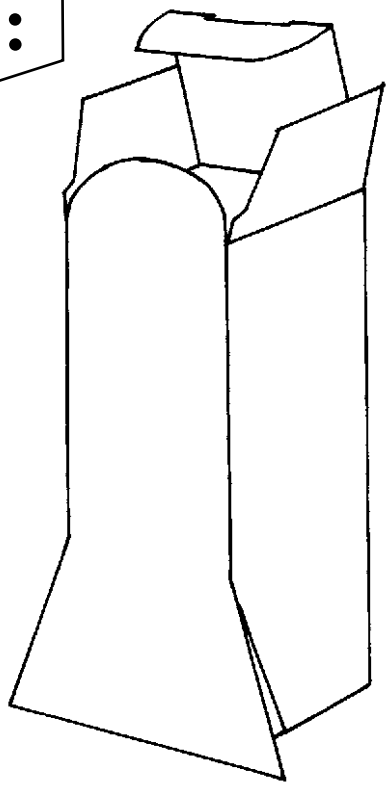
This multifaceted pentagonal box has both visual and tactile appeal.





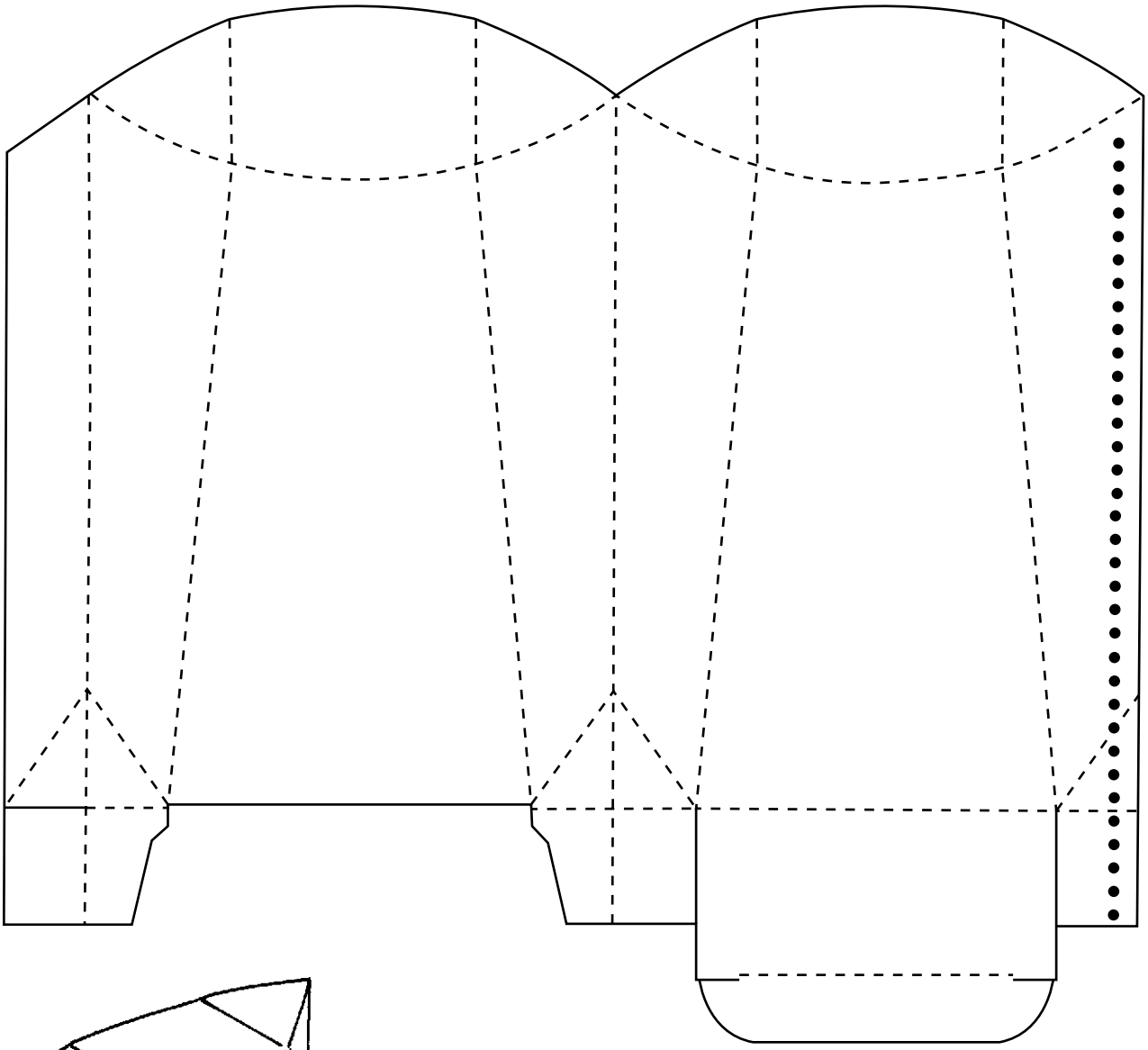
A different treatment of the top side-panel scores and closure tab. This carton features an auto-lock bottom.

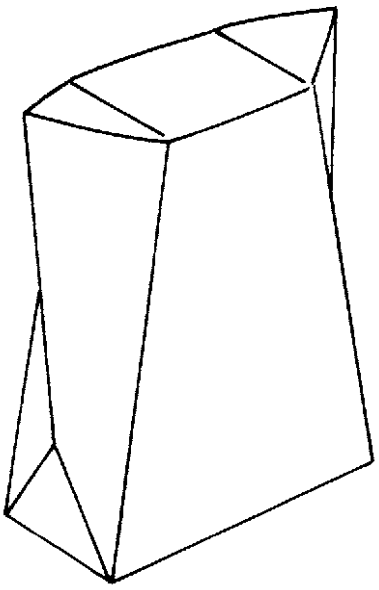


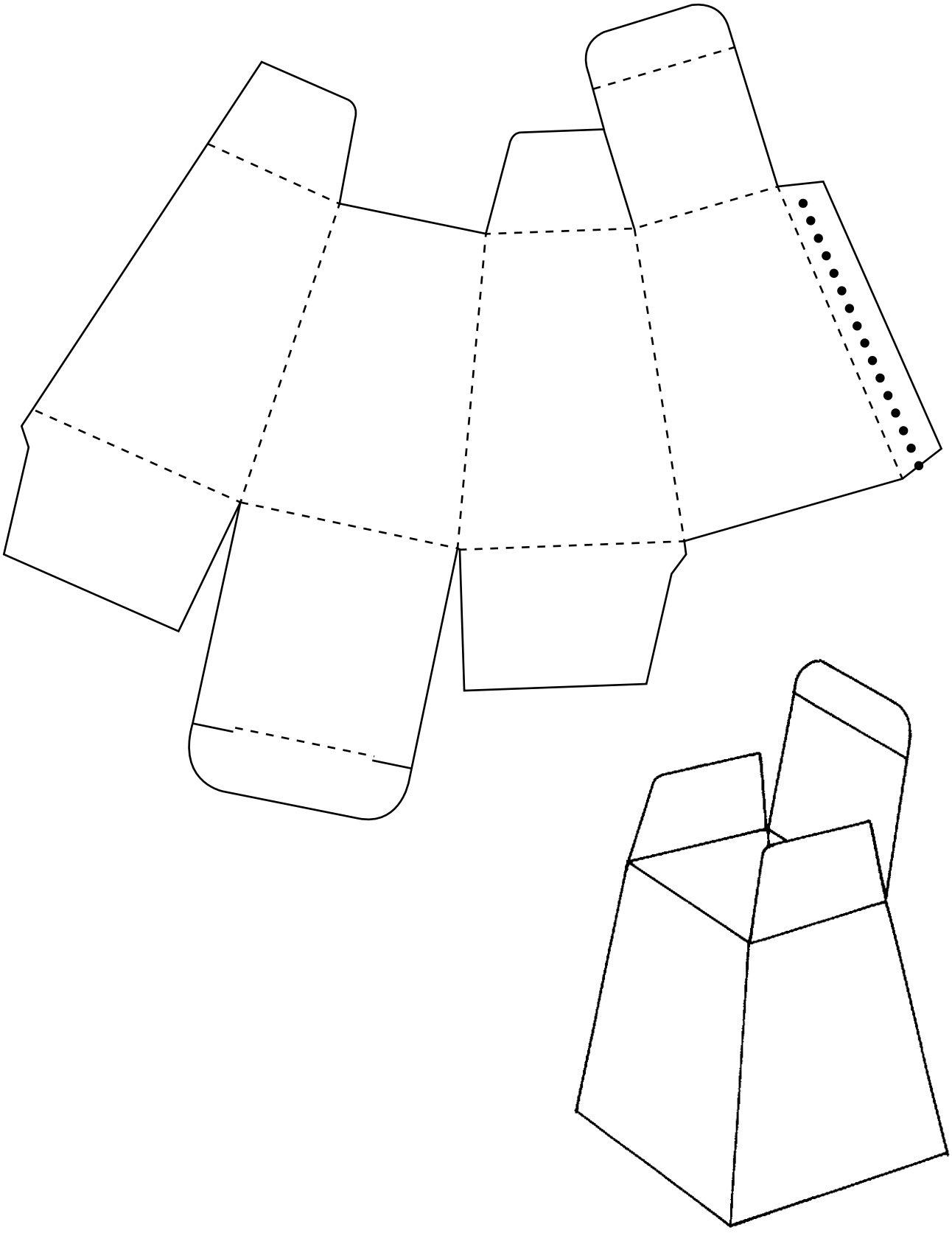


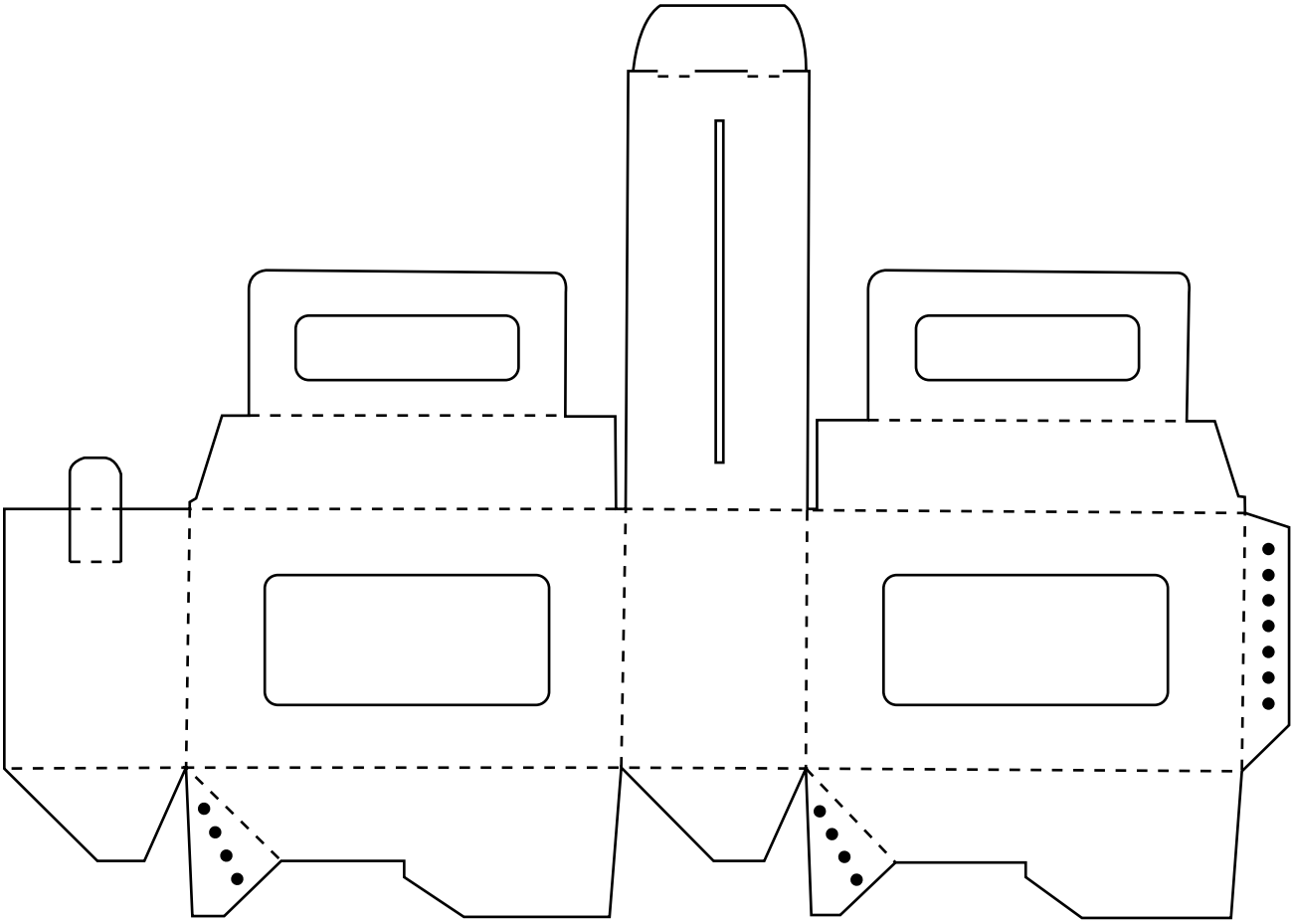
Manipulating the panel by means of die cuts creates many interesting design variations.

BOTTOM TUCK, TOP SNAP-IN COVER

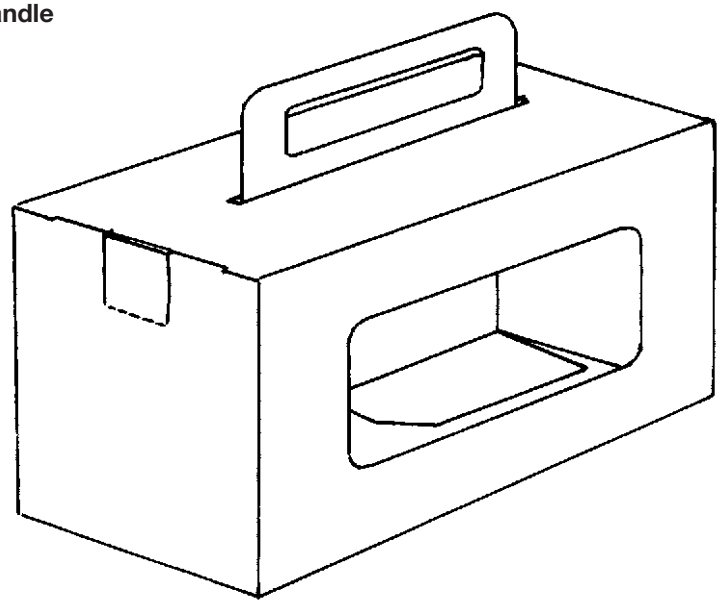


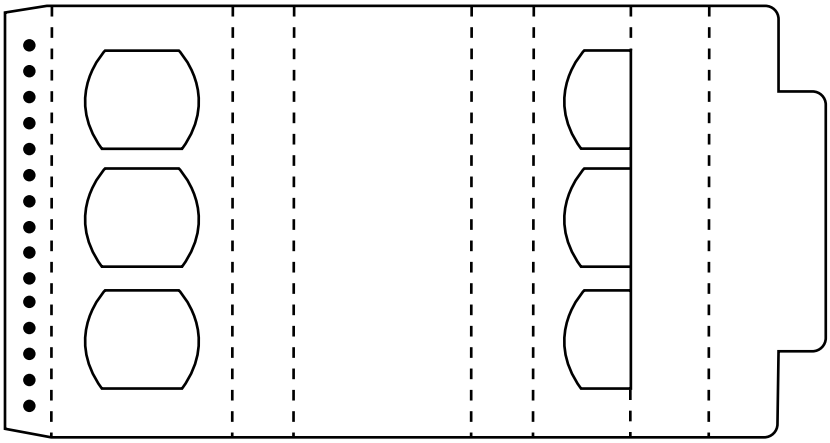


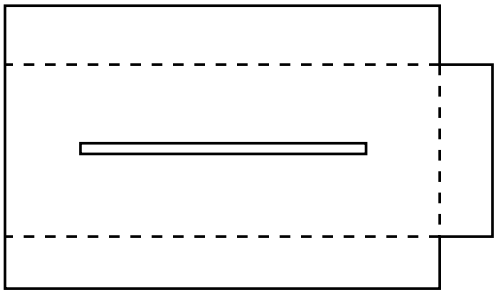


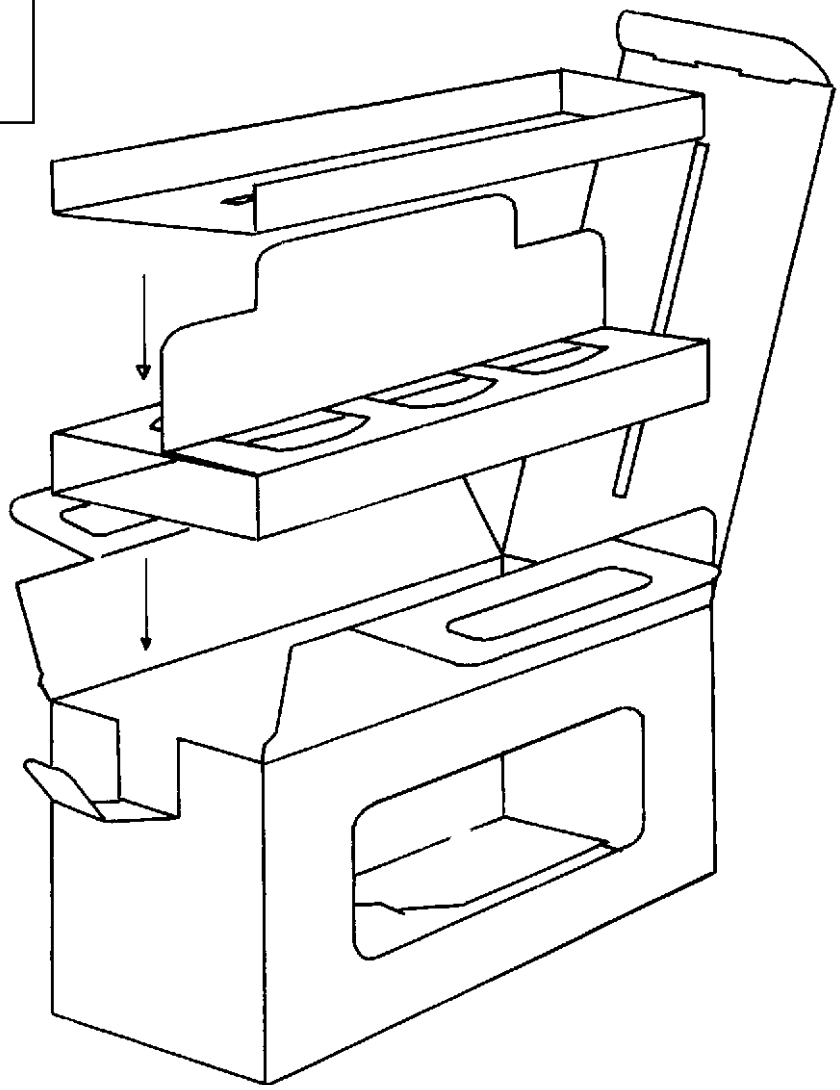


In combination with the patterns for the inserts on the facing page, this package with carrying handle was created for six small body lotion bottles.

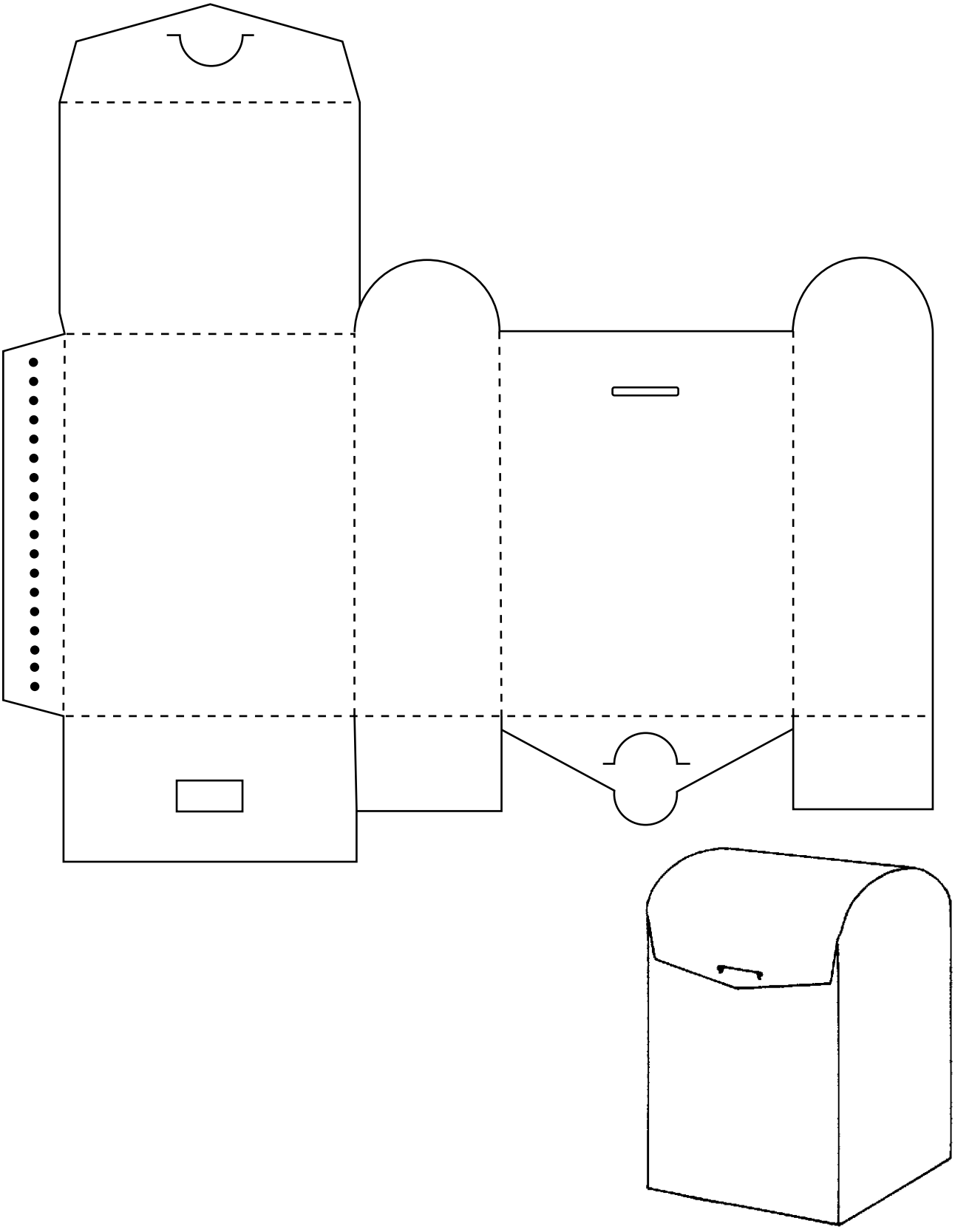


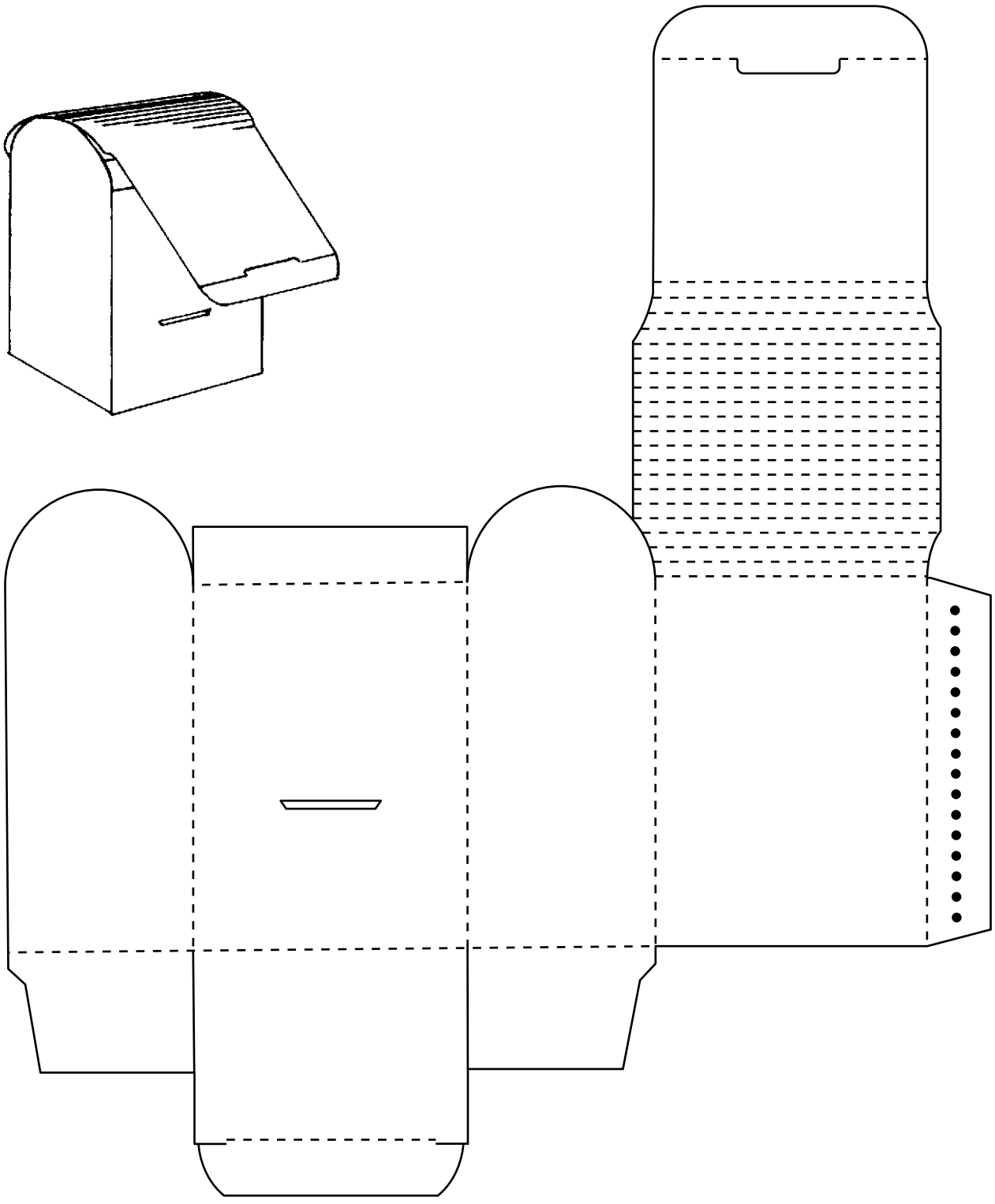




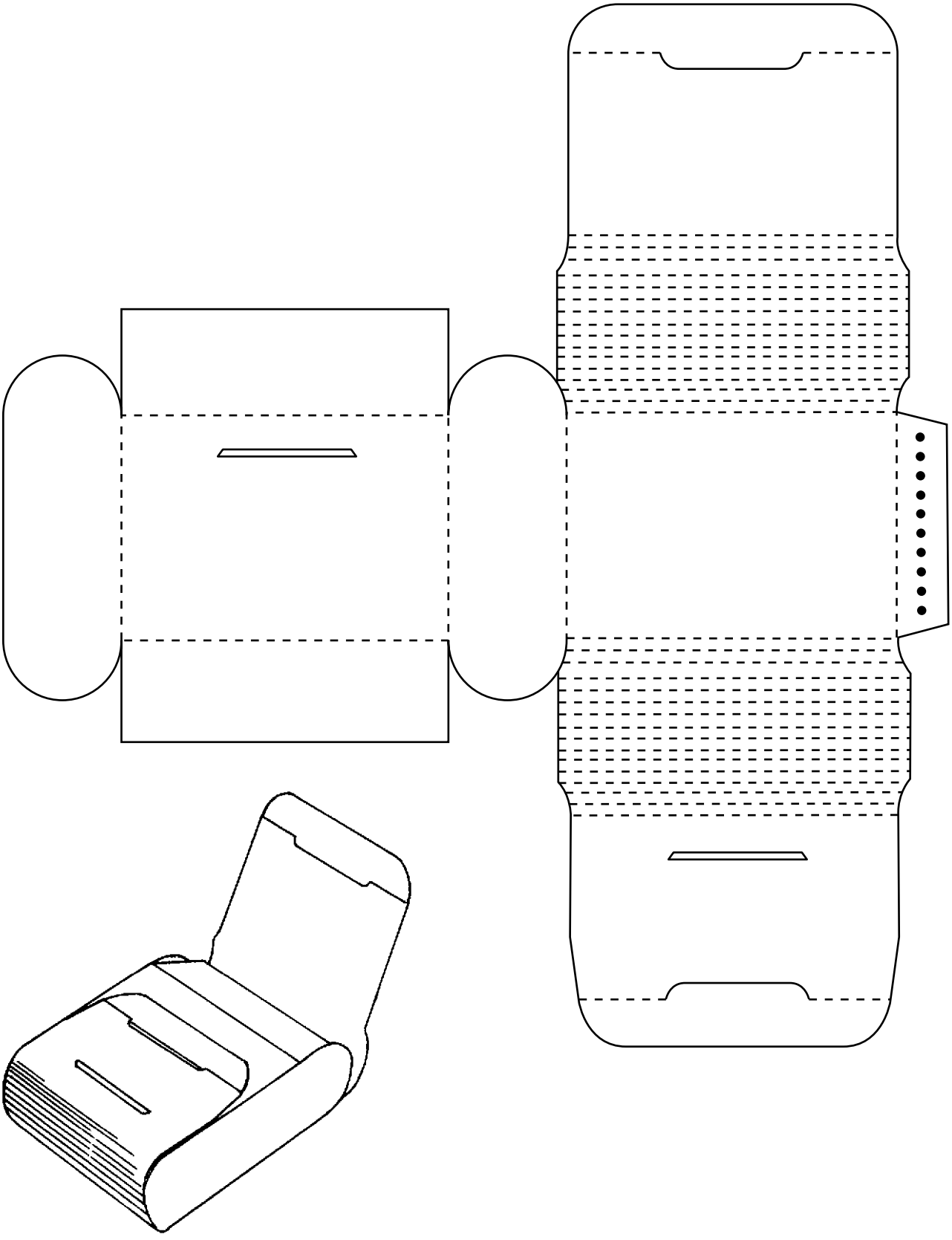


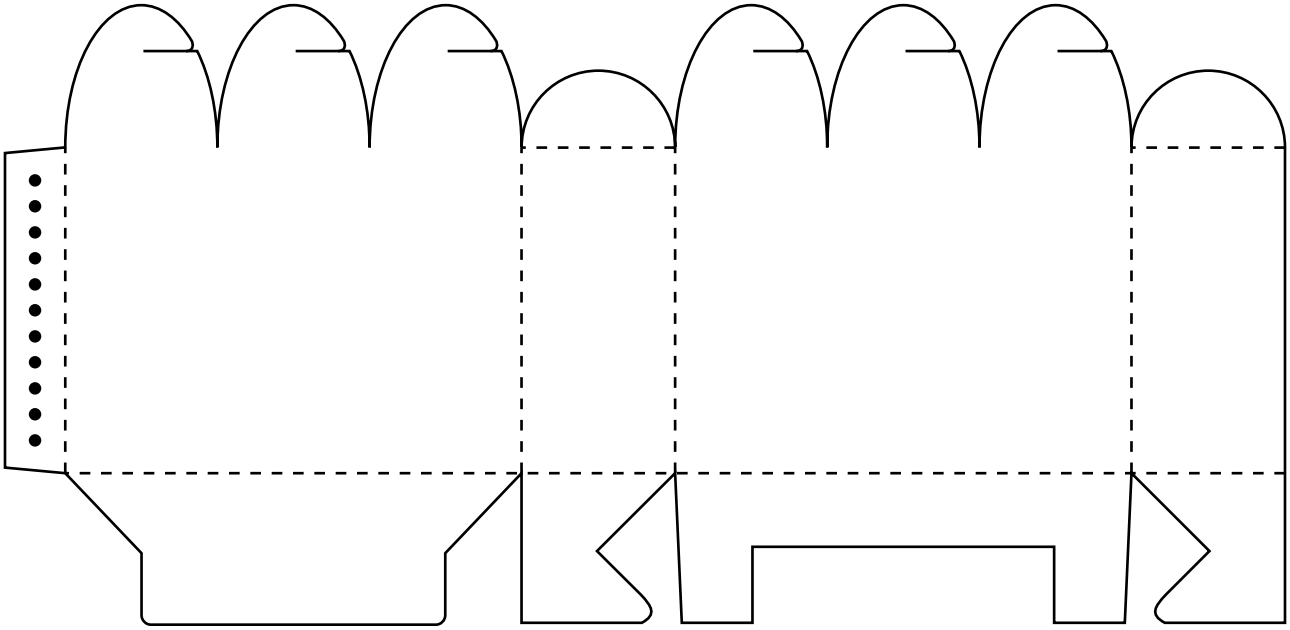
DOME TOP WITH SPECIAL TAB CLOSURE, GREENLEAF BOTTOM



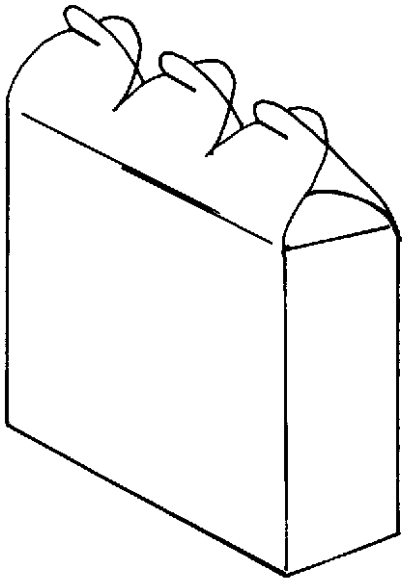


SPECIALLY SCORED TOP AND BOTTOM WITH FULL OVERLAP LOCK TAB AND SLIT

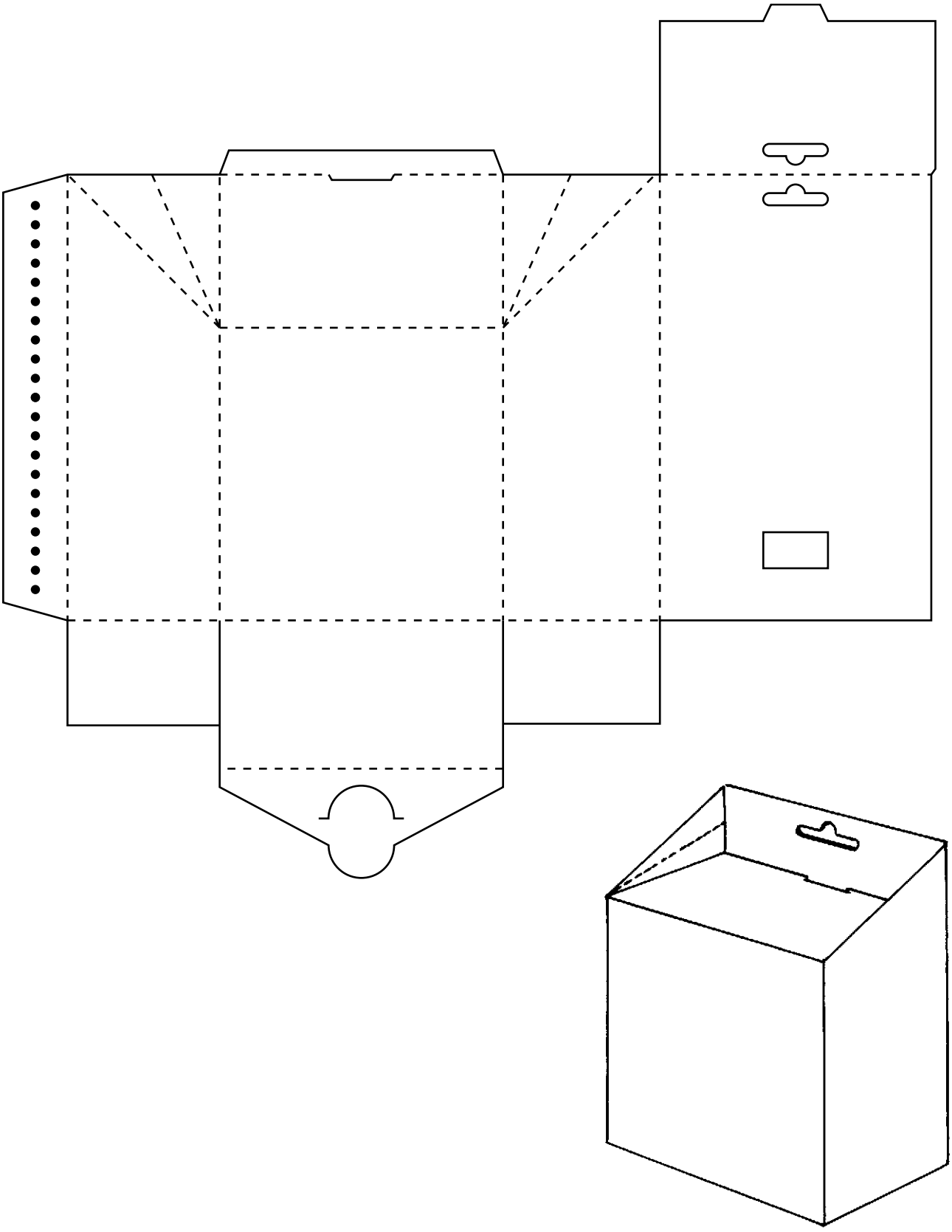




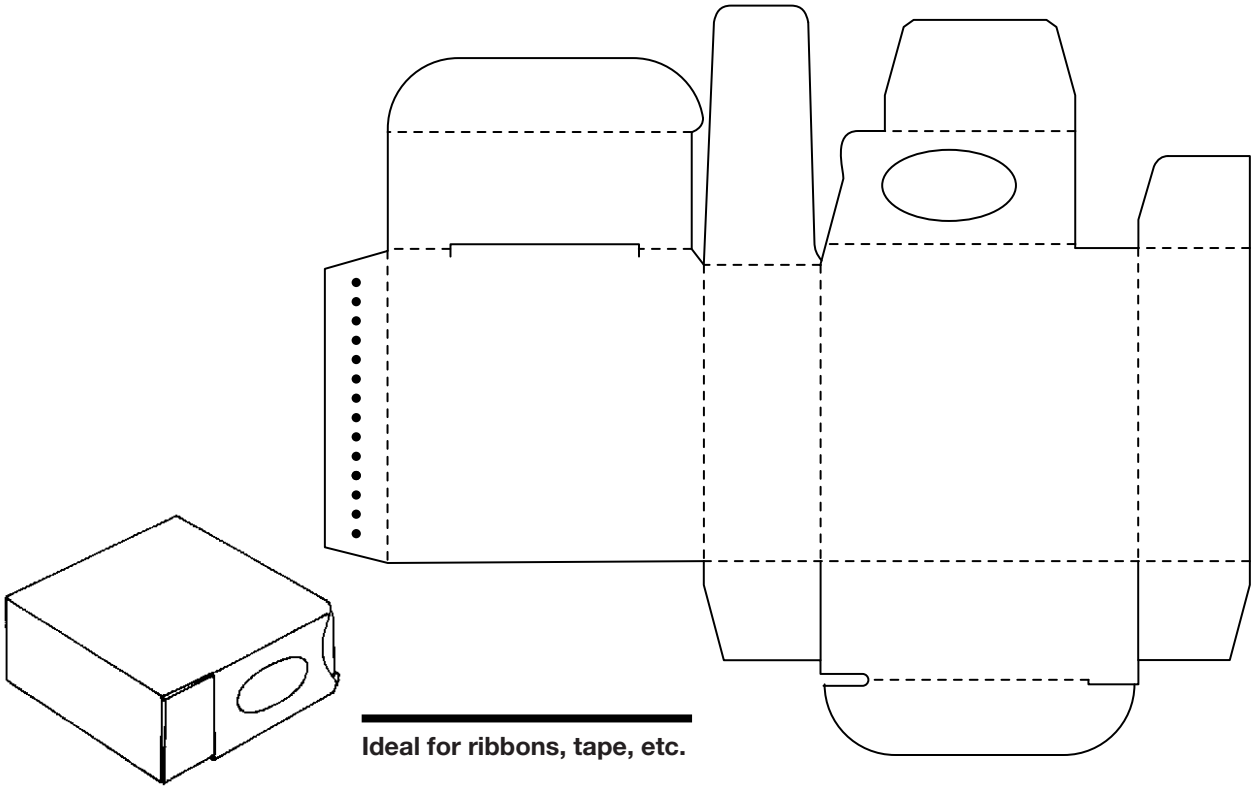
A carton with a variation of Arthur locks and 1-2-3 bottom develops into an attractive alternative packaging form.



PUSH-IN LOCK TOP WITH GREENLEAF BOTTOM

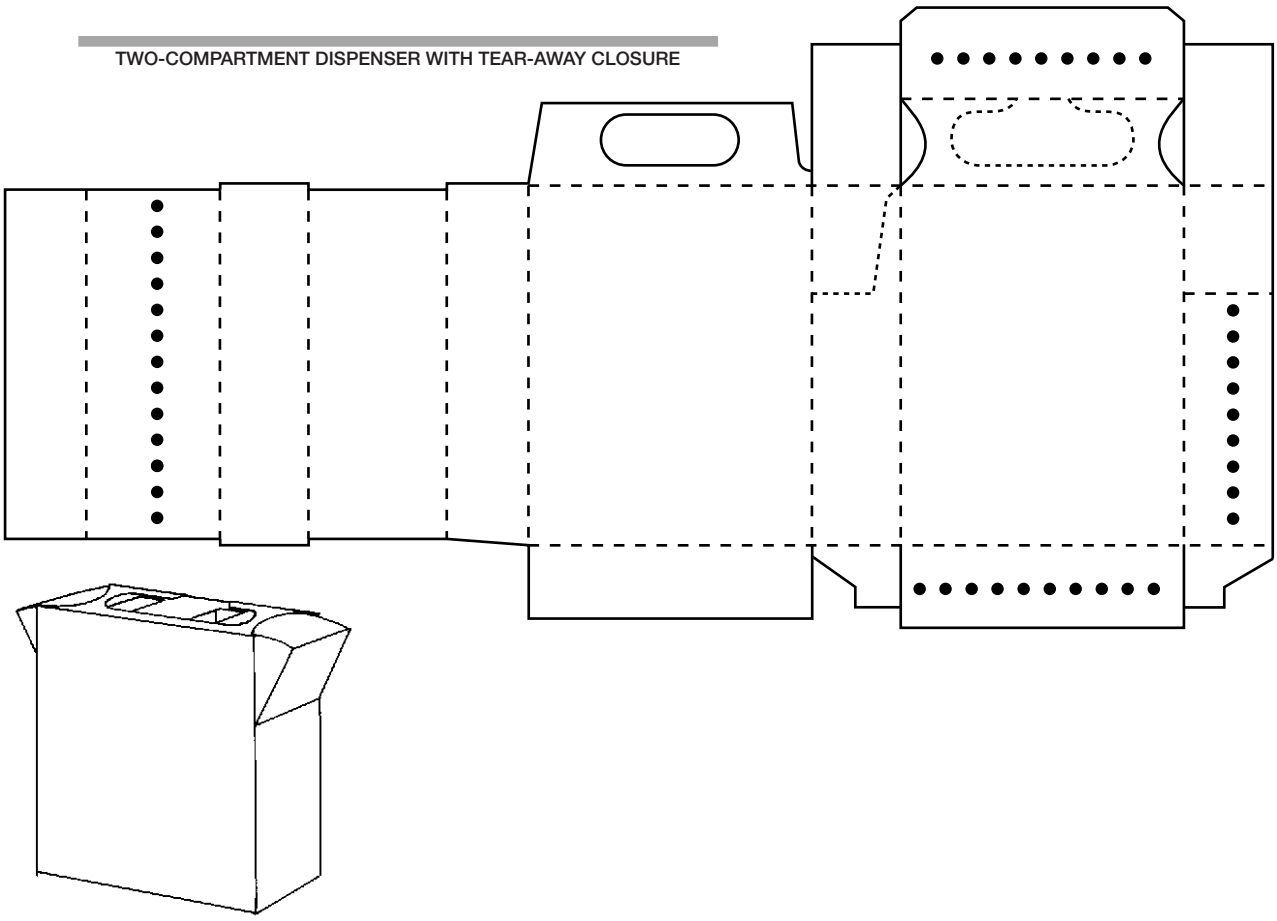


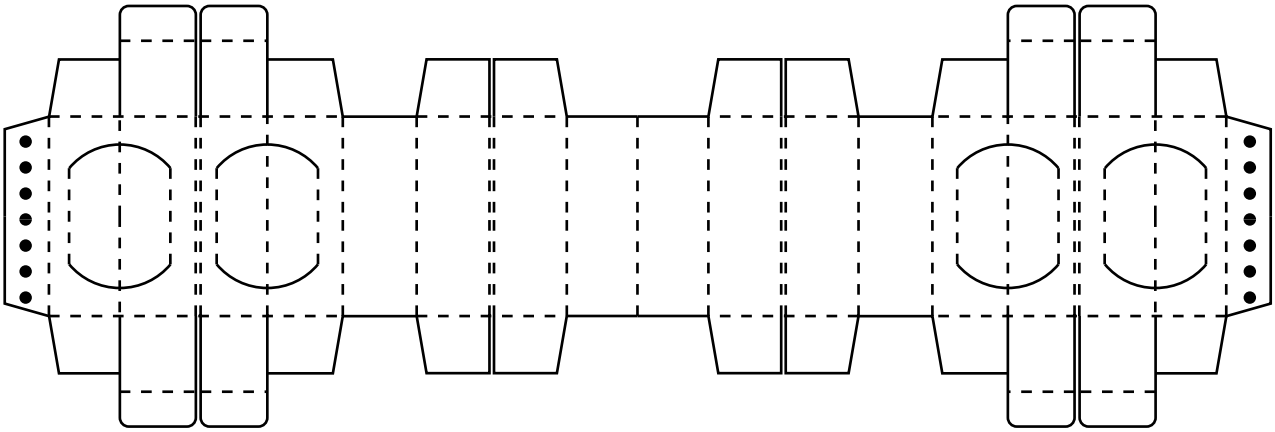
REVERSE TUCK WITH SPECIAL DISPENSER PANEL

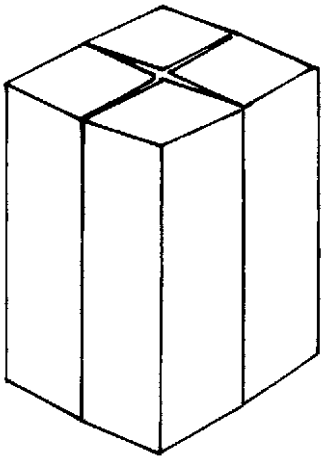


Ideal for ribbons, tape, etc.

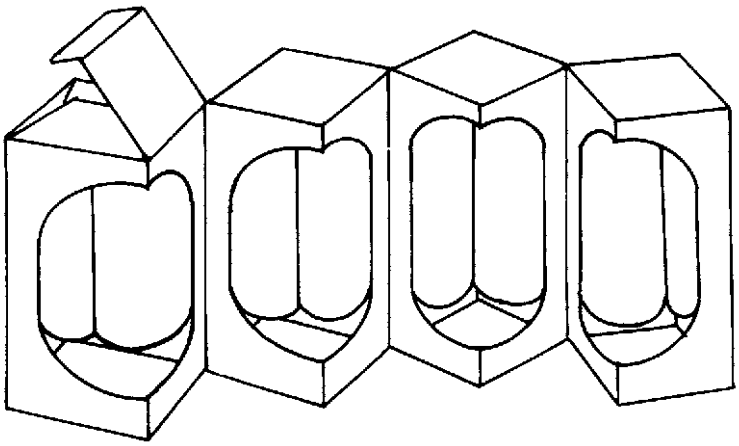
TWO-COMPARTMENT DISPENSER WITH TEAR-AWAY CLOSURE

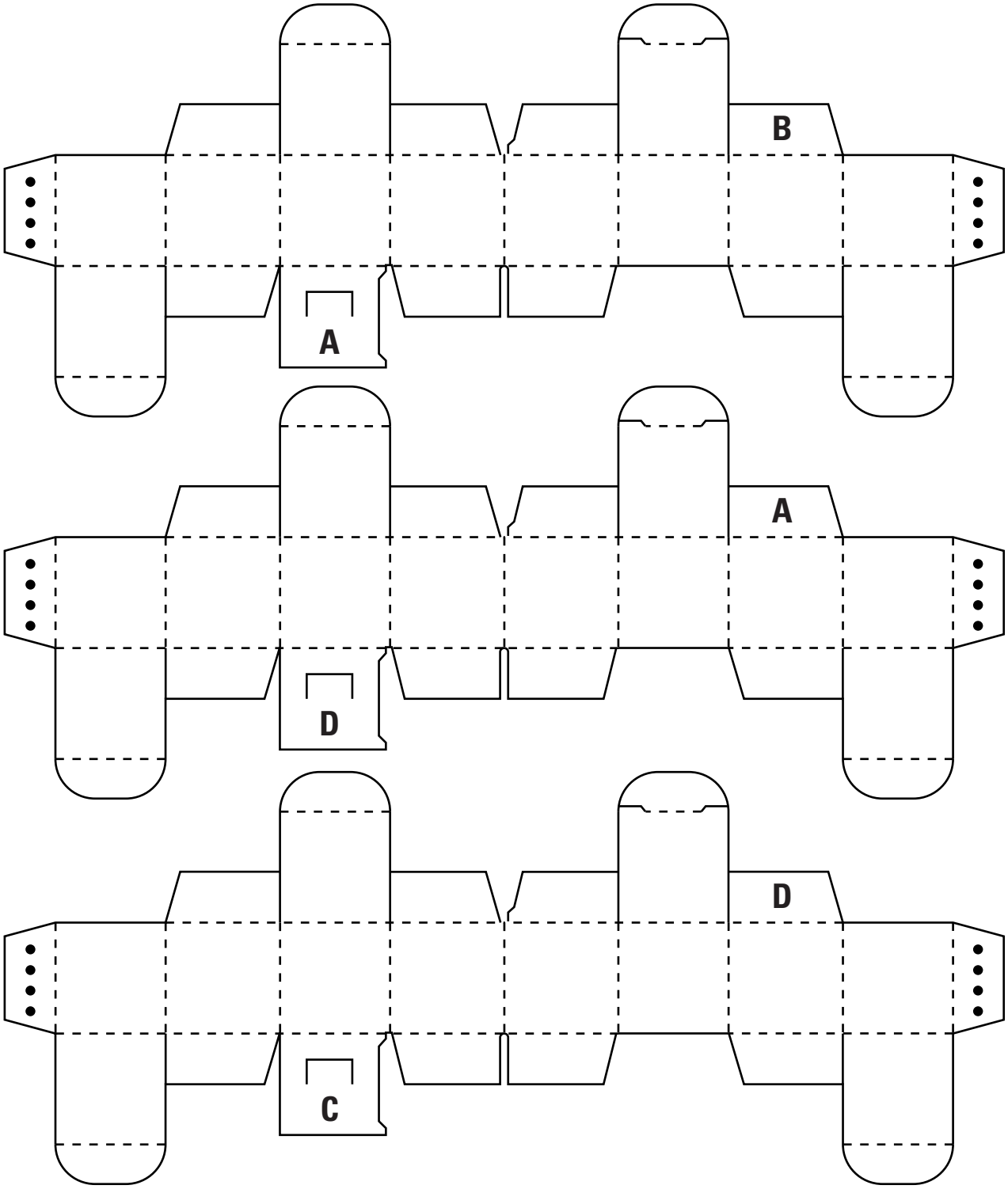




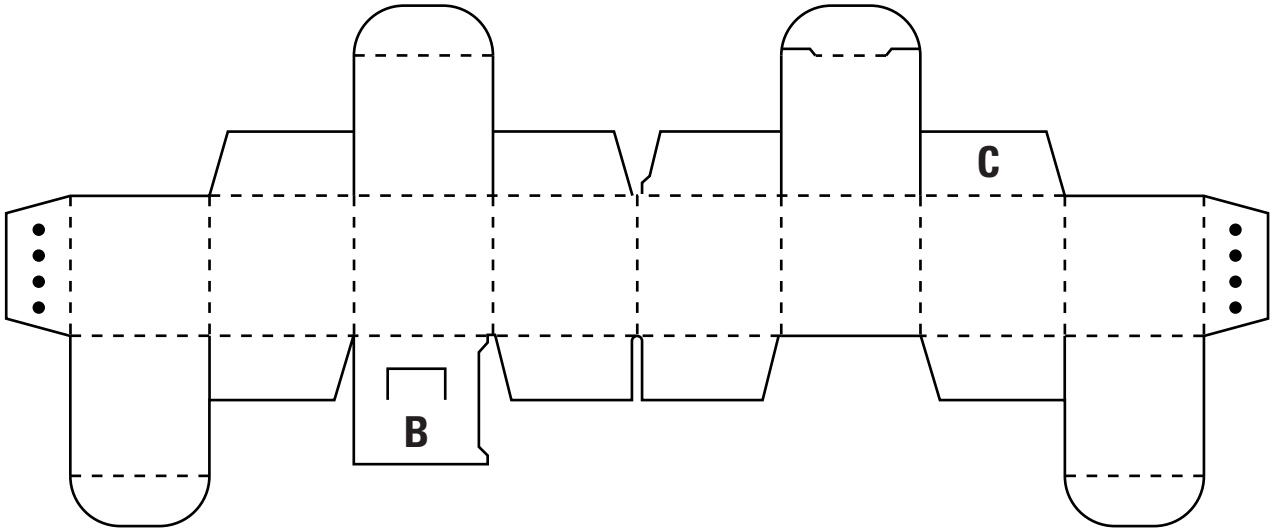


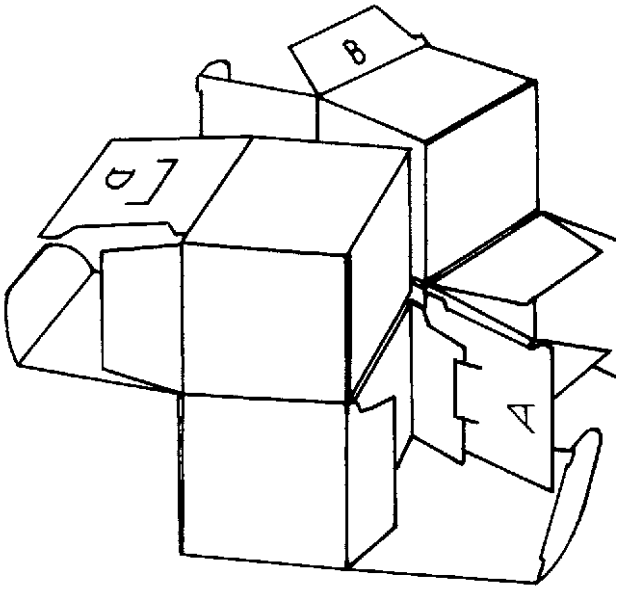
This quadruple box is ideal for sets of items such as cosmetics.

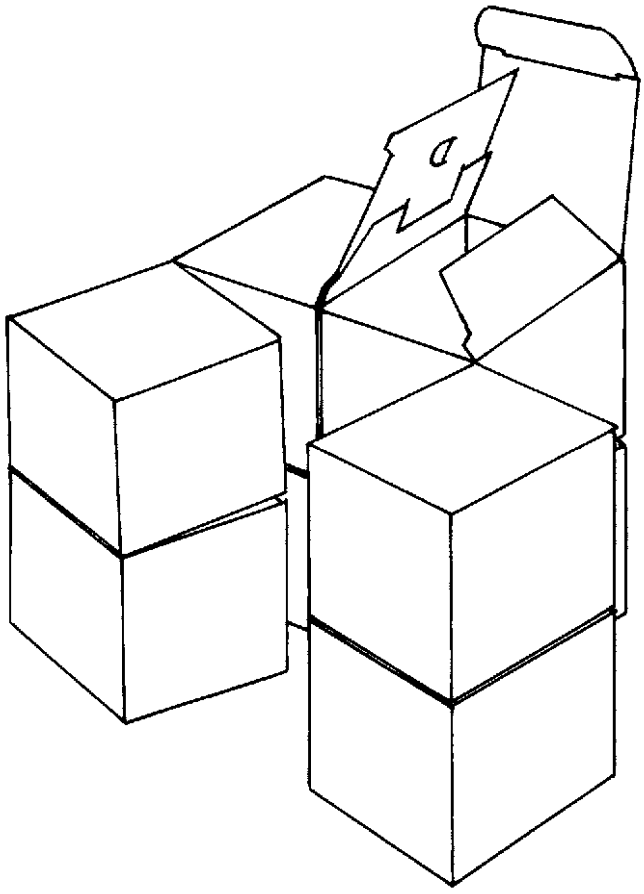




The eight cubes interlock at the dust flaps as indicated. This allows for many graphic innovations.


C
B


B
A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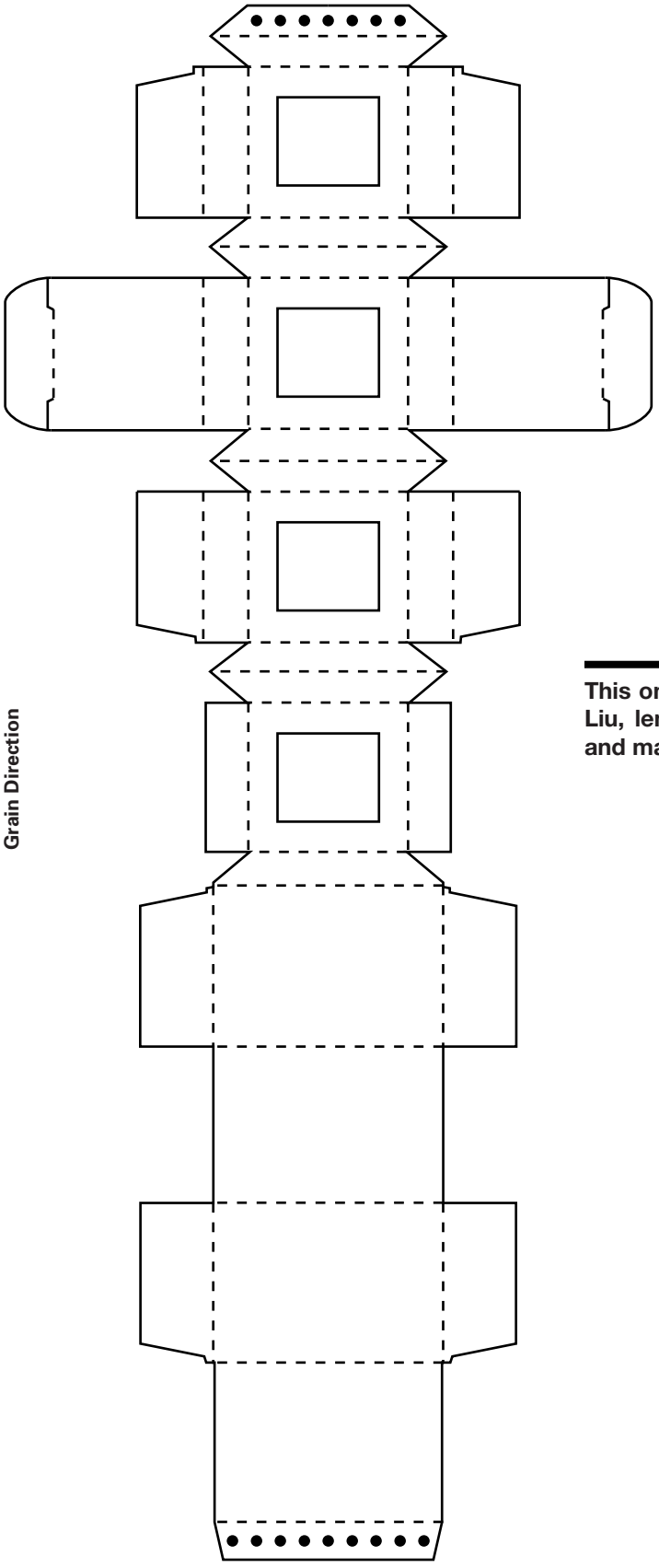
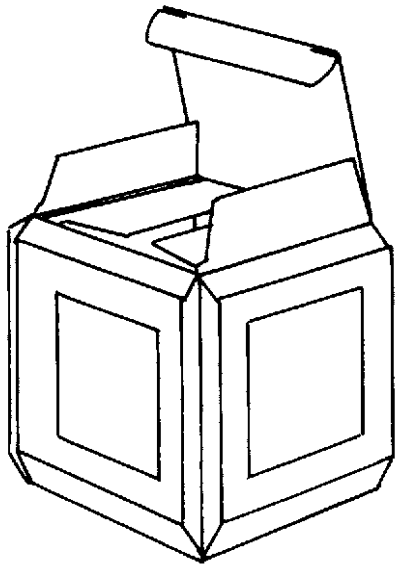
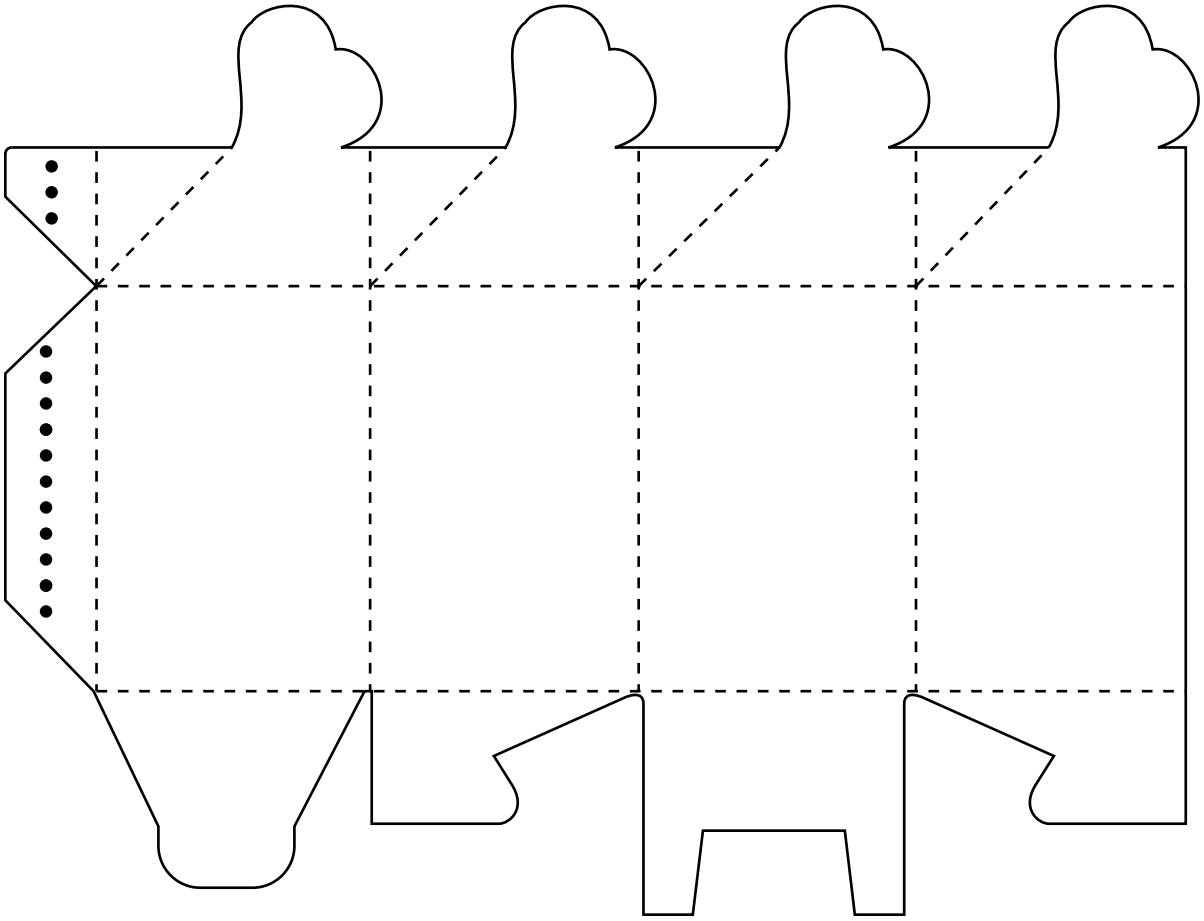


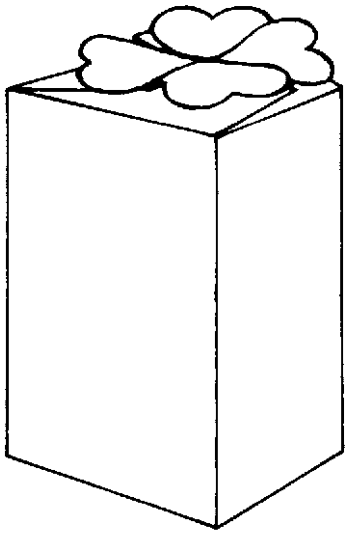
Grain Direction

This one-piece shadow box, designed by Yick-Man Liu, lends itself to a great assortment of graphics and makes a beautiful gift package.



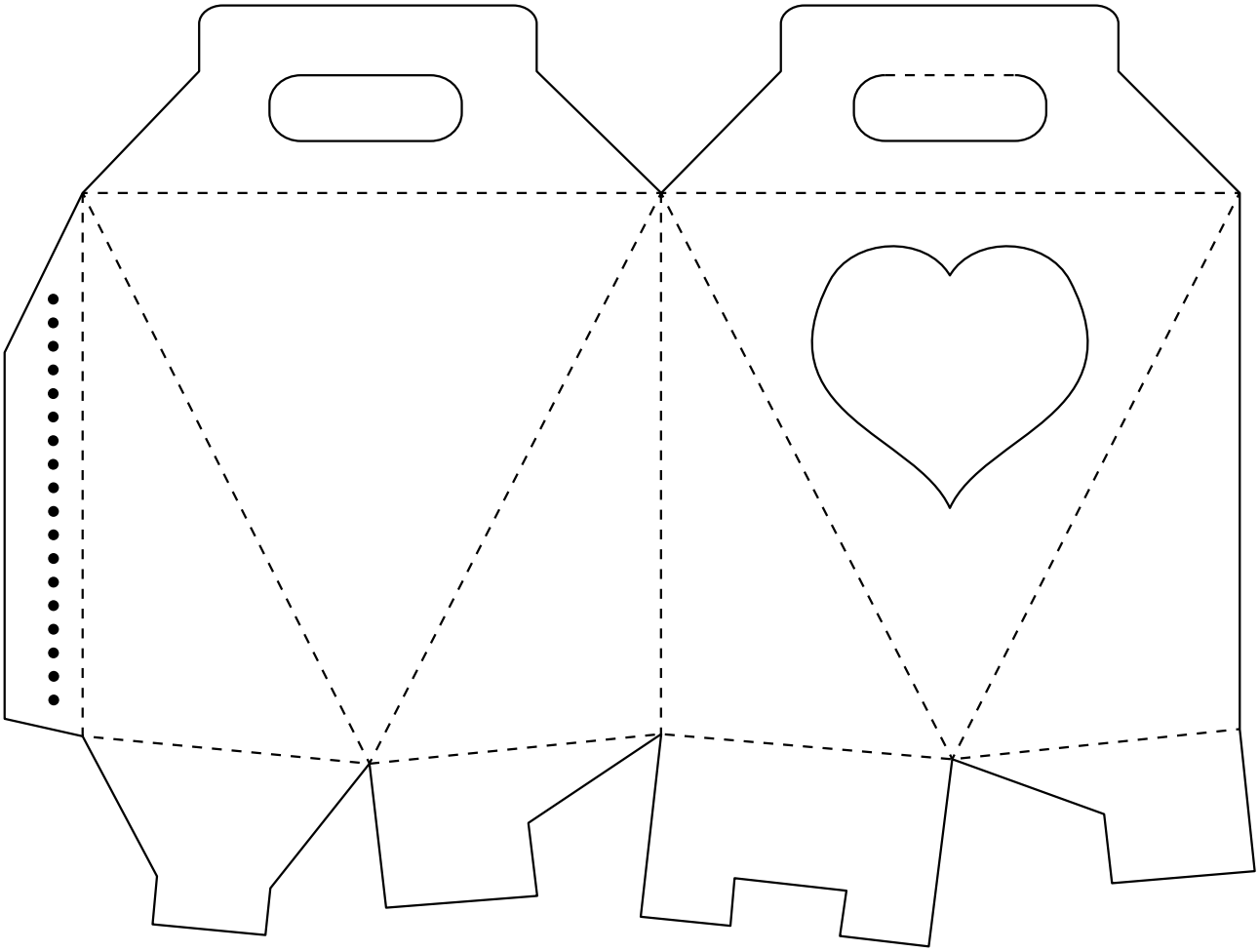
FOUR HEARTS CLOSURE

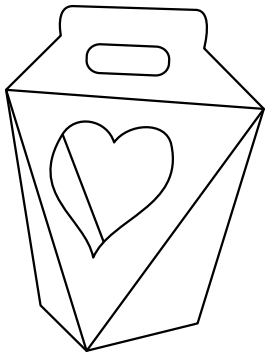


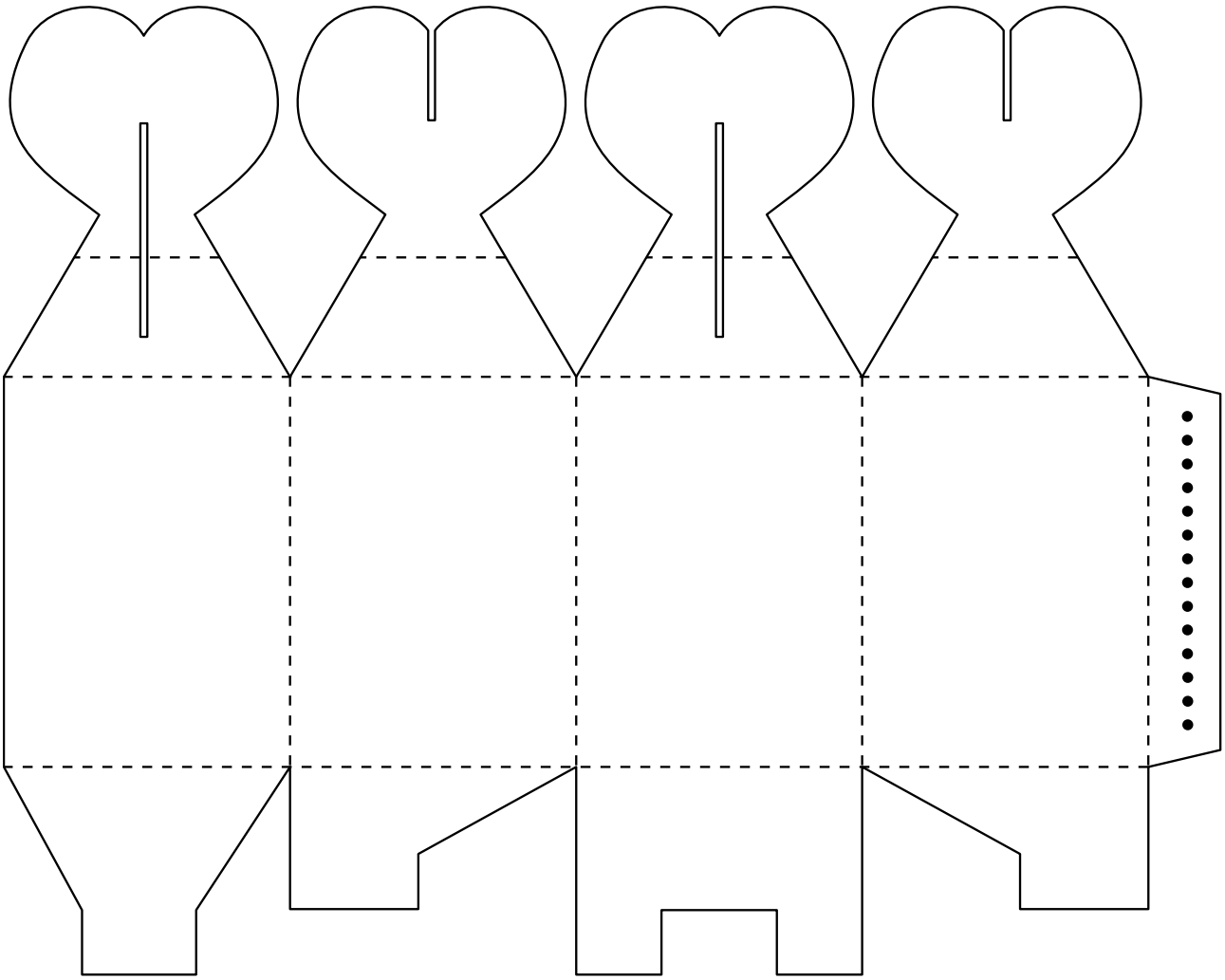


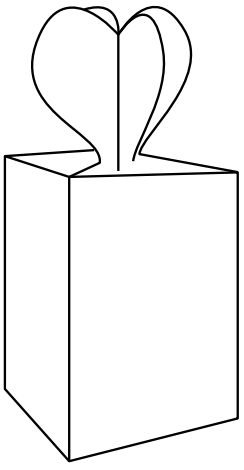
This is but one of the many design possibilities for top closure.

CARRIER WITH HEART WINDOW

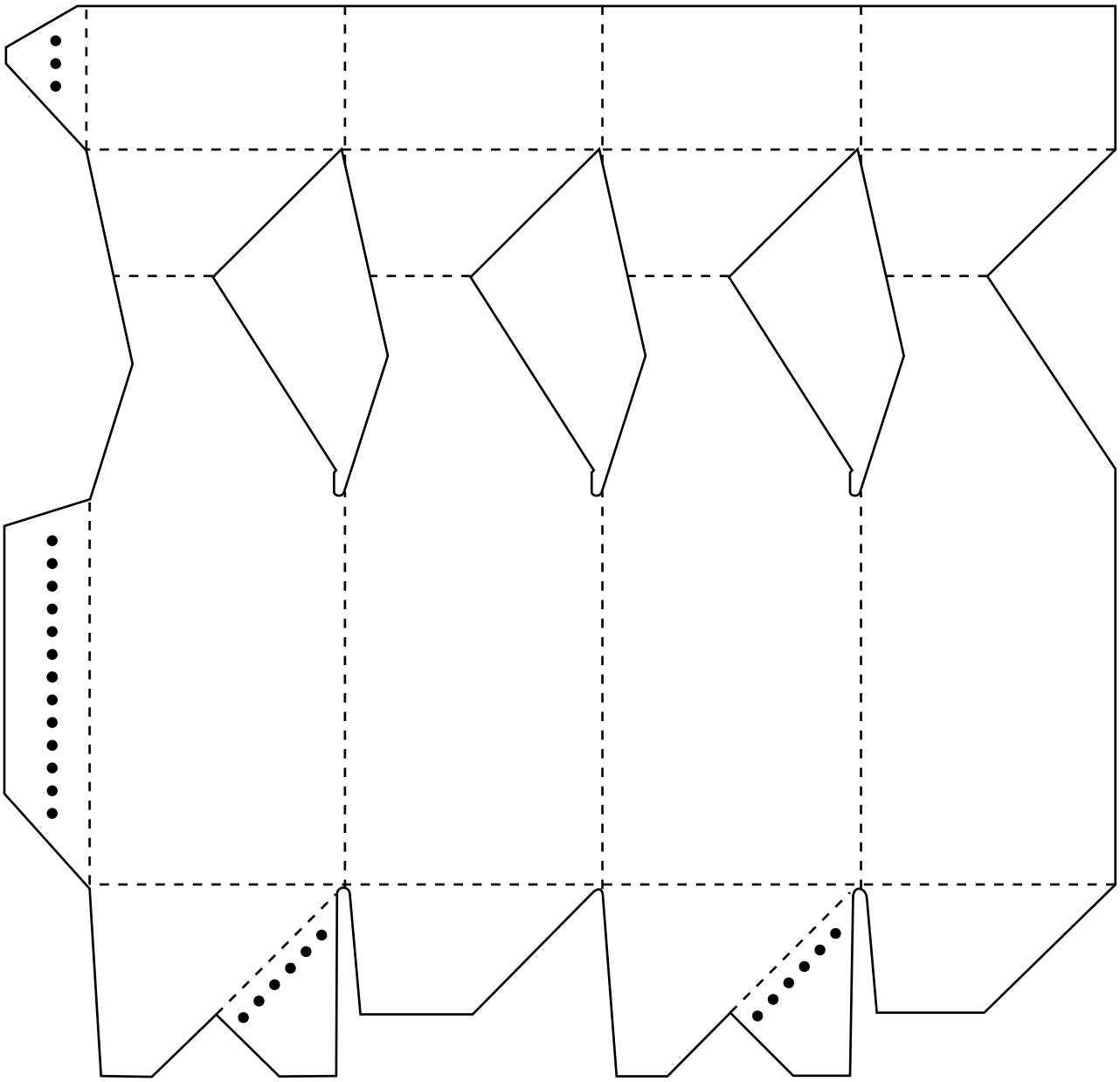


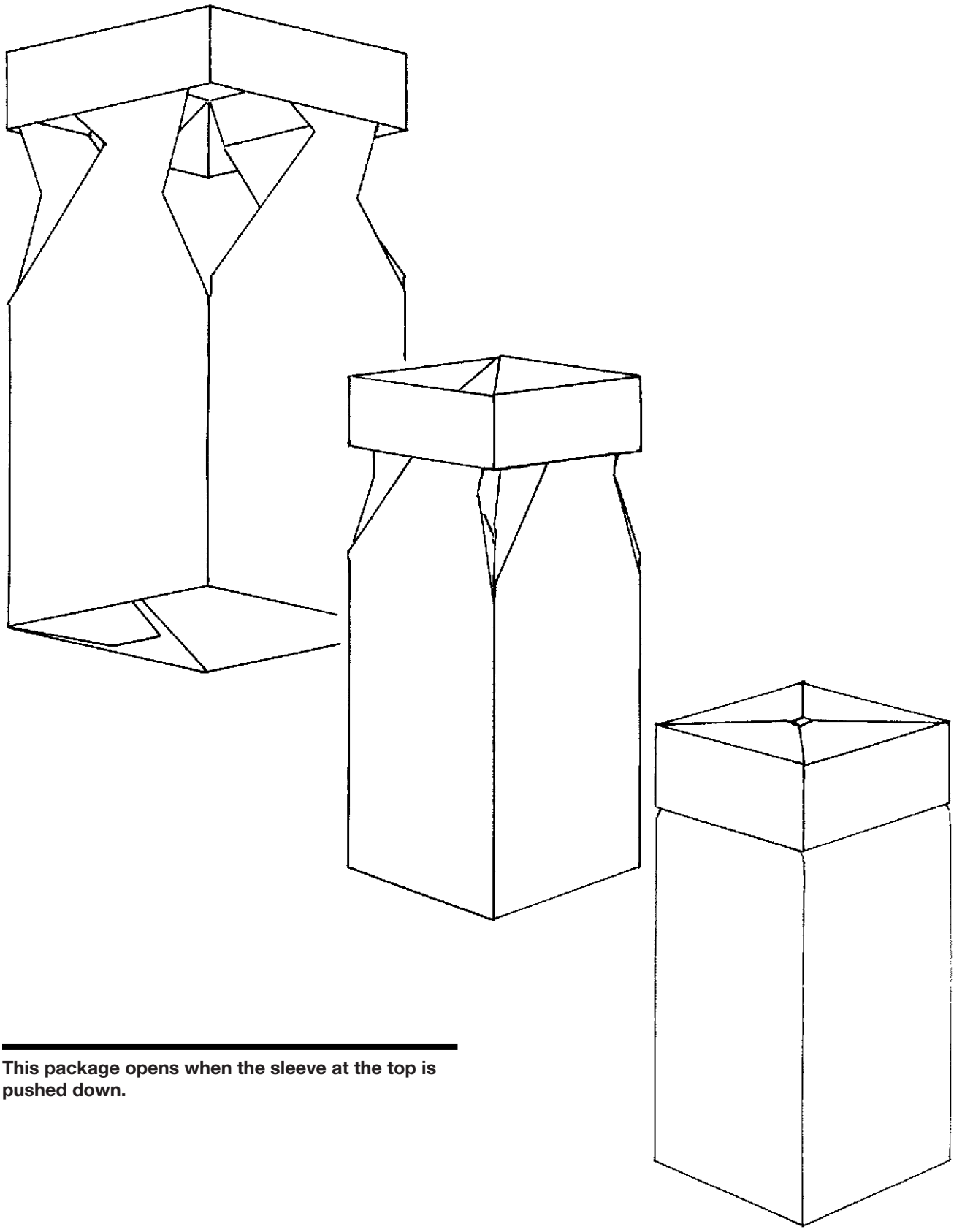




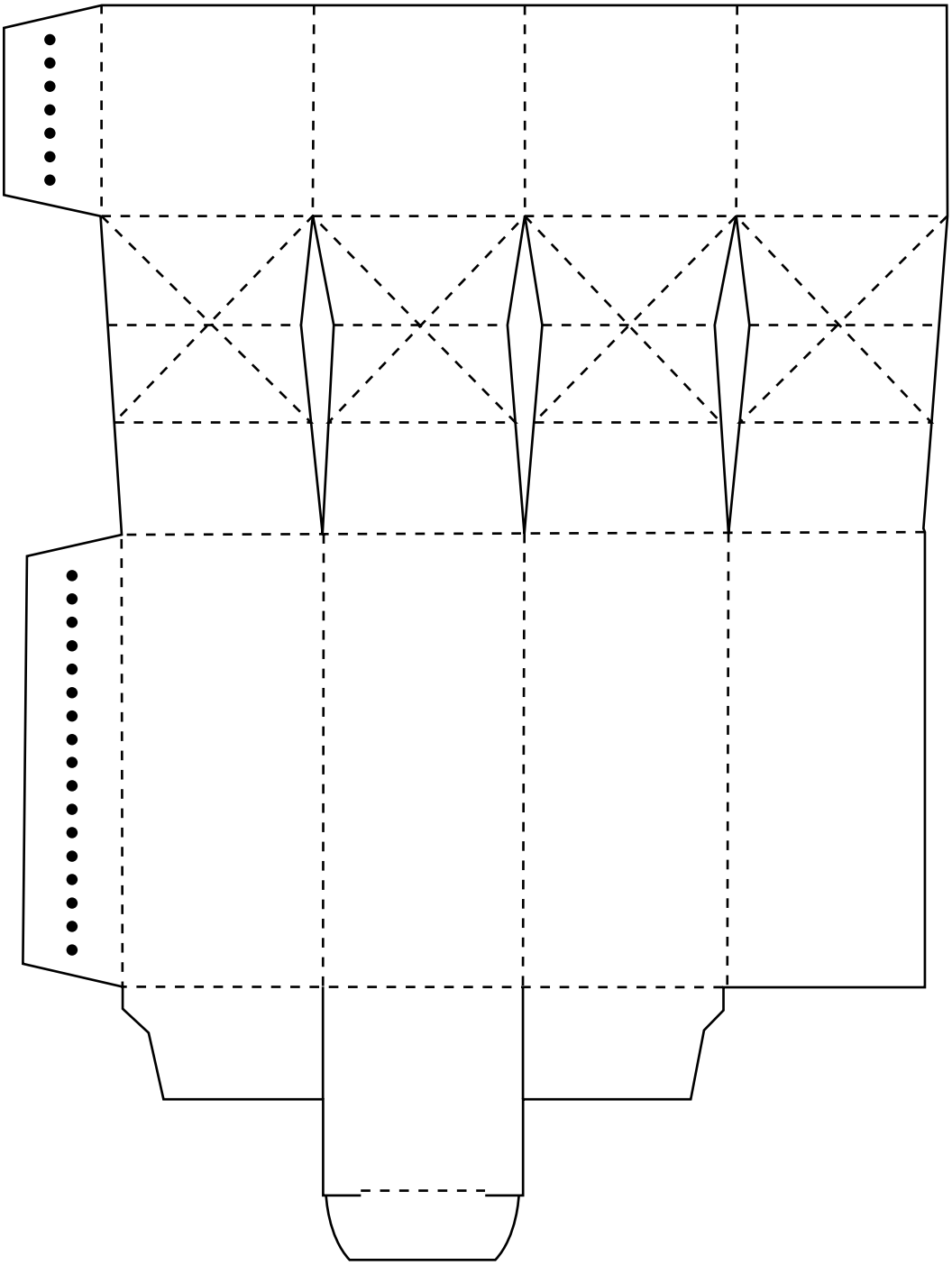


PUSH-DOWN OPENING TOP

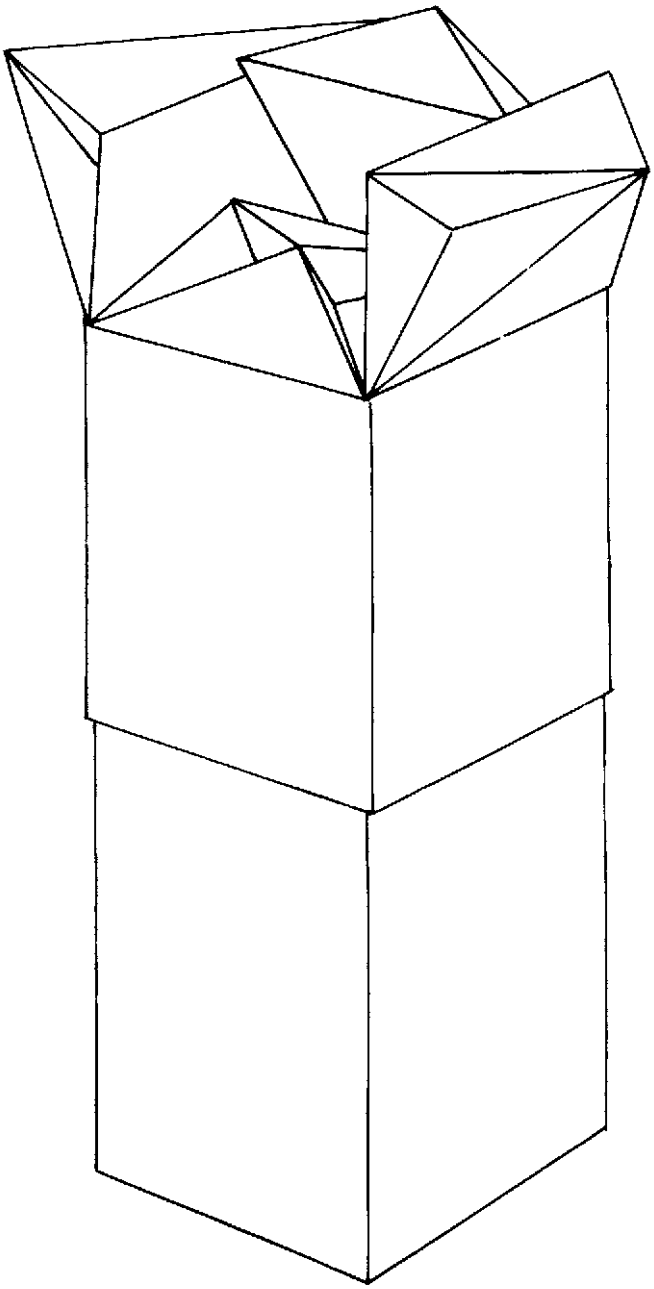


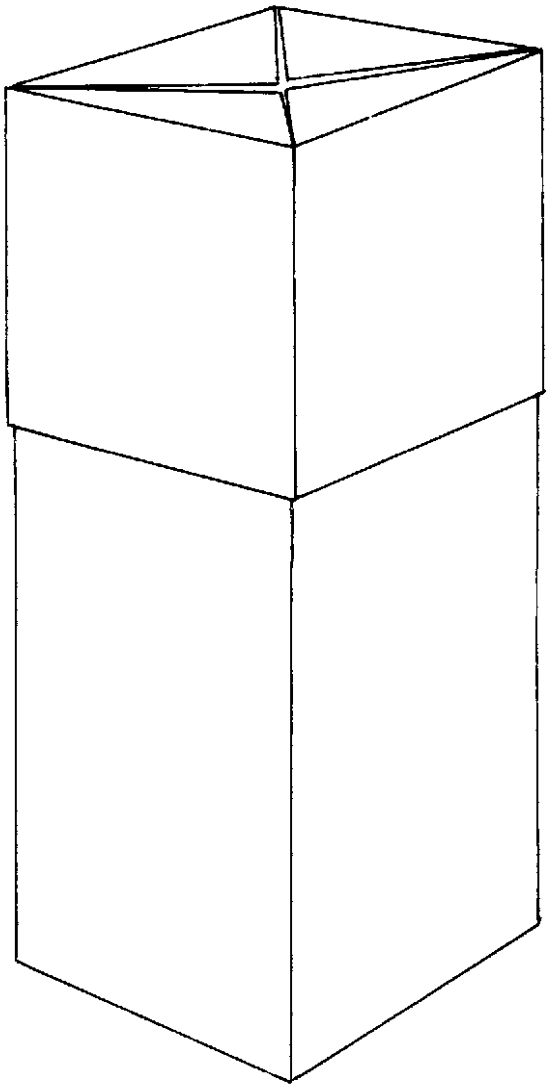


This package opens when the sleeve at the top is pushed down.

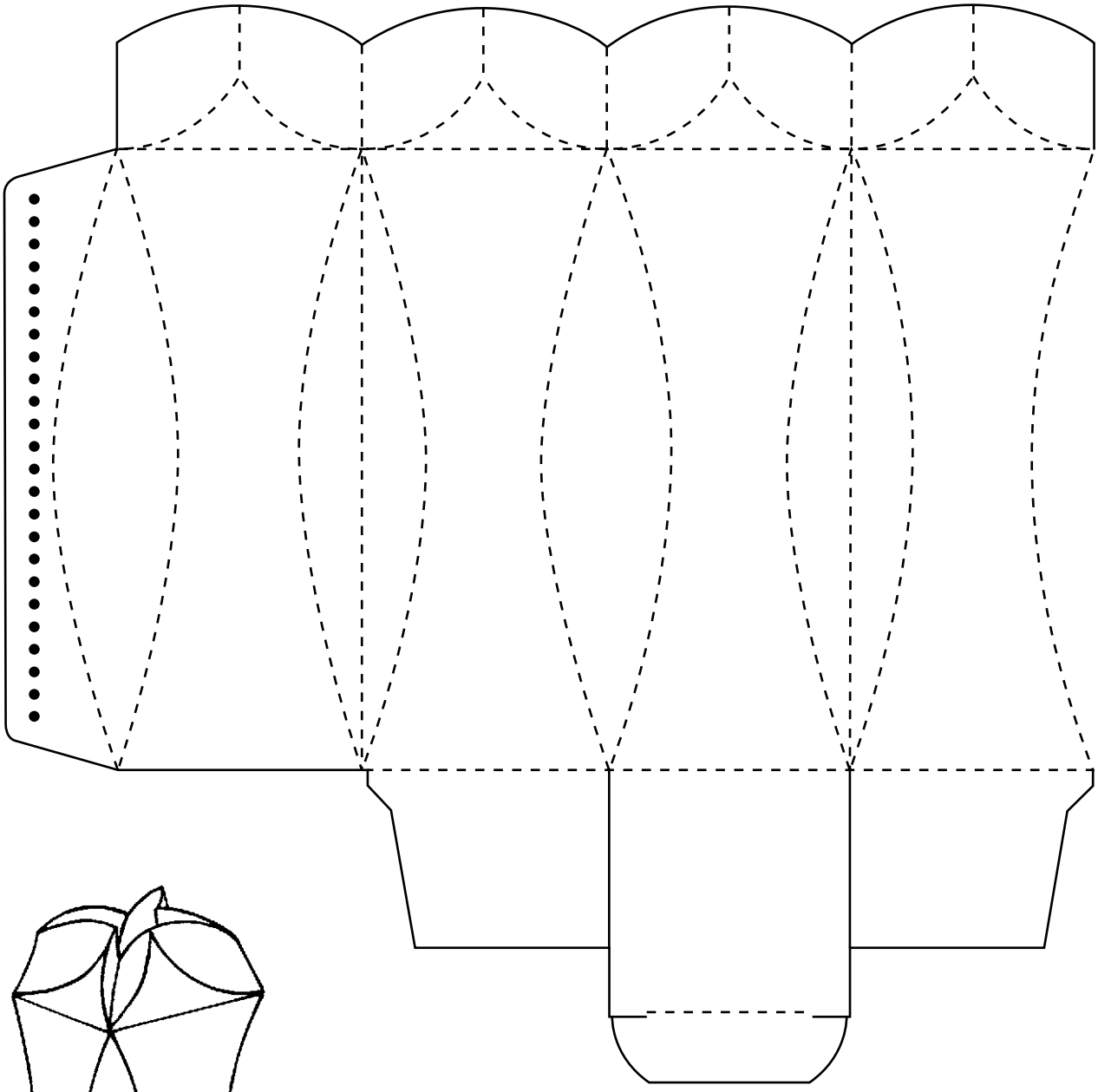


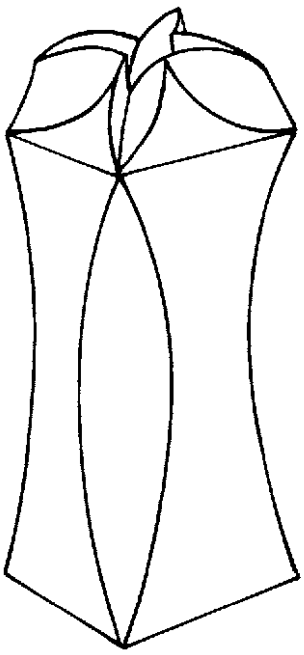
OPEN AND CLOSED VIEW OF PUSH-DOWN OPENING





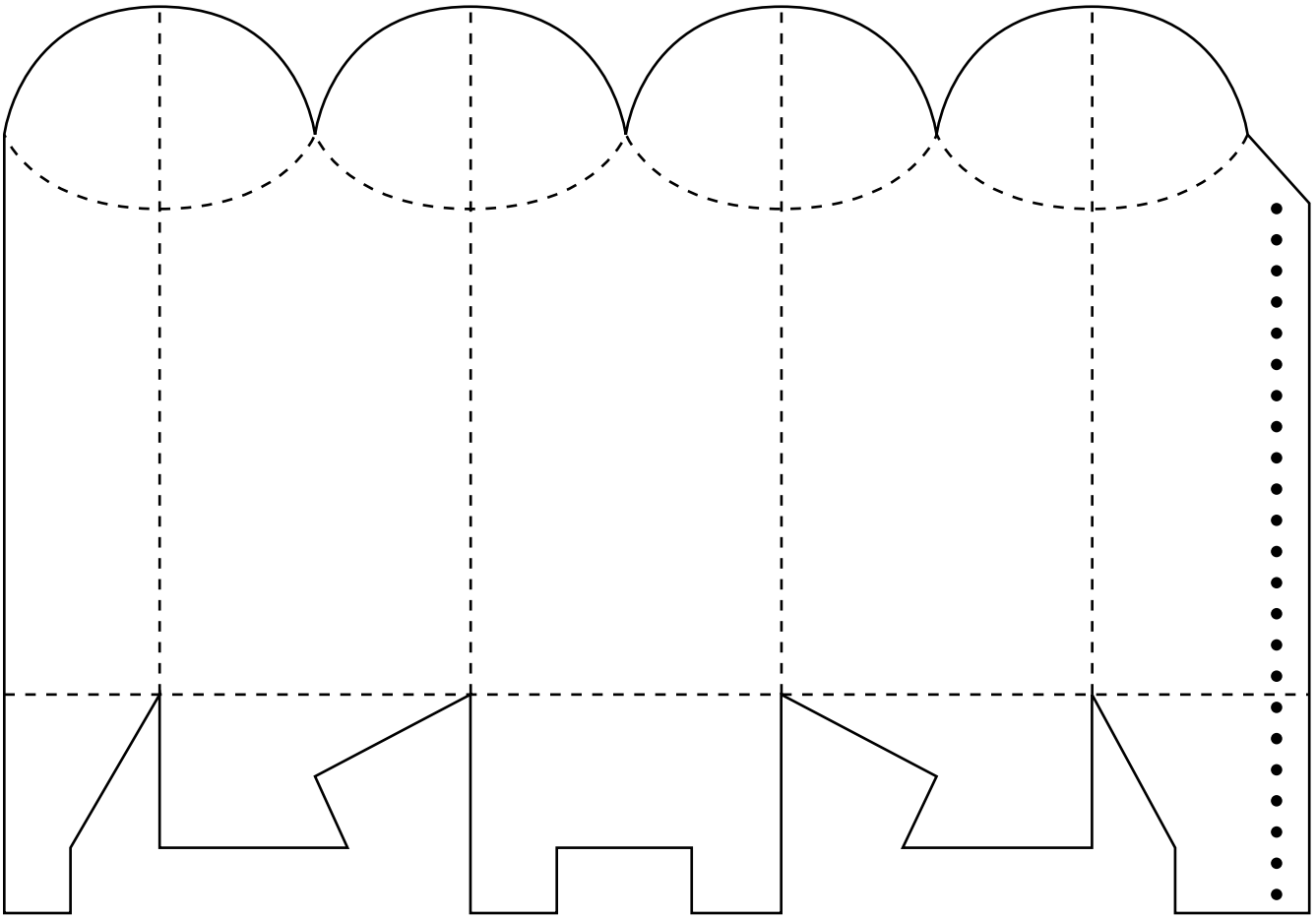
As the top overlapping sleeve is pushed down, the triangular closure shapes open. Sliding the sleeve up will close the top.

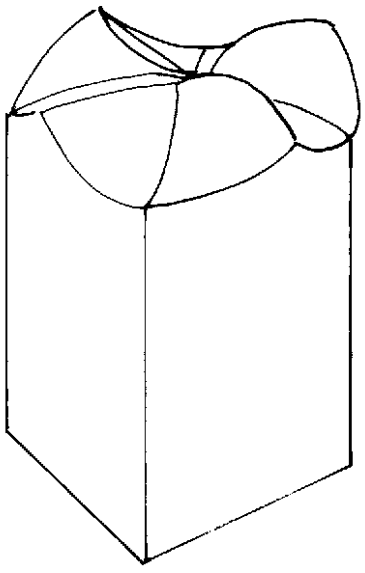


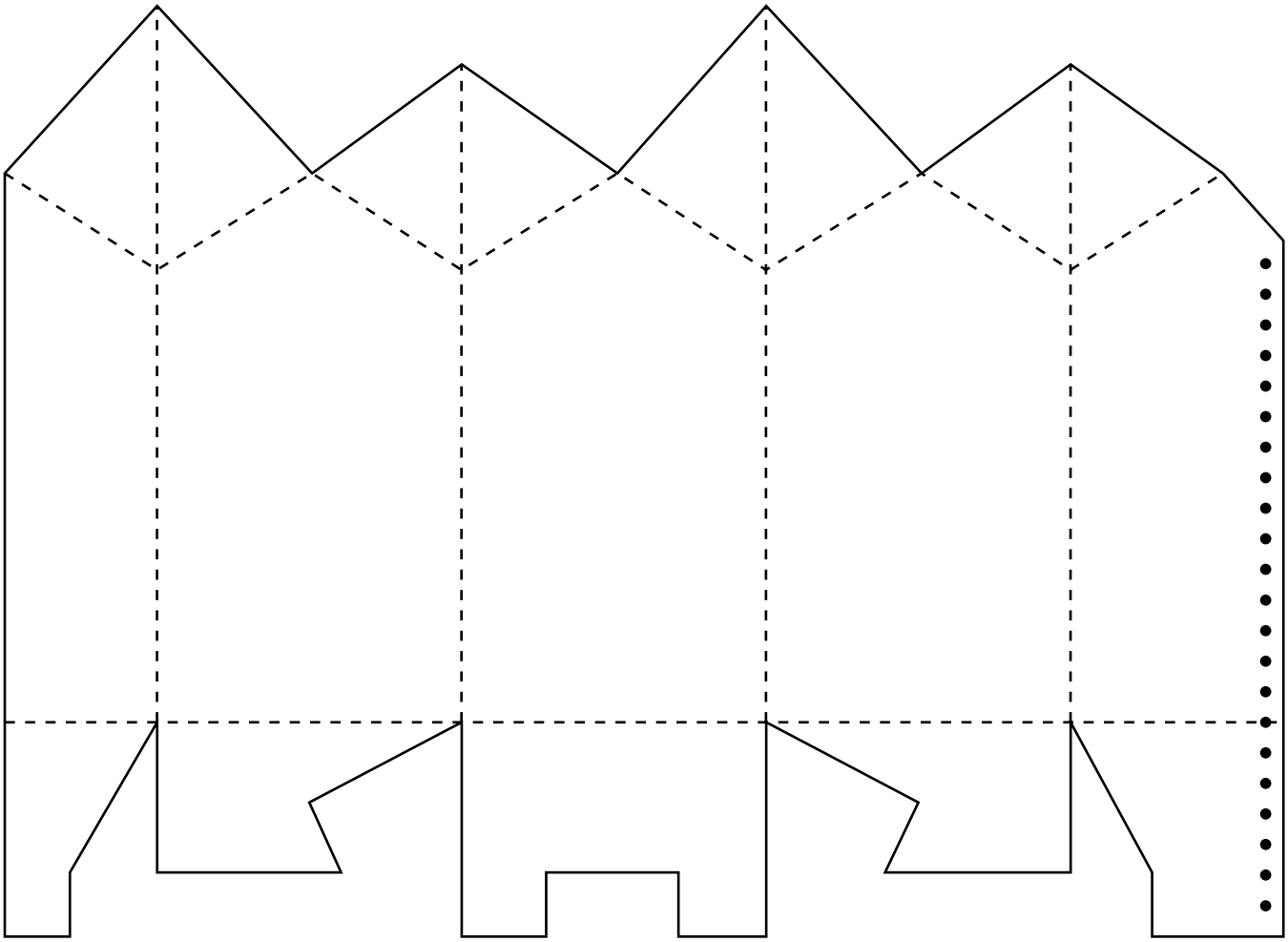


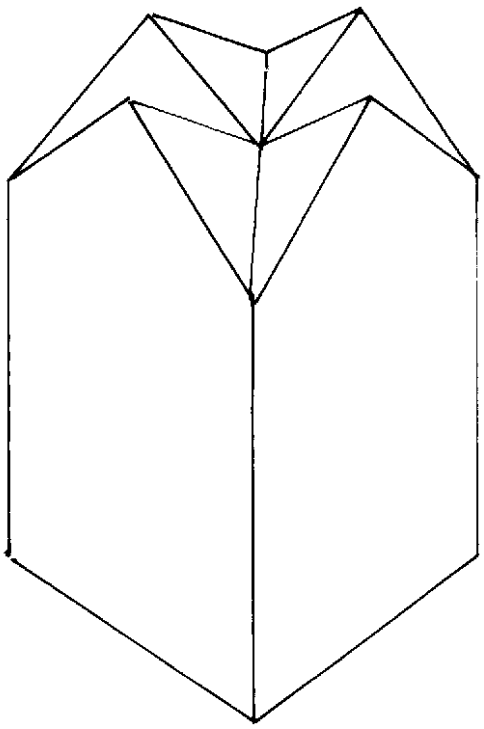
Curved scores create many interesting effects, which may be enhanced by innovative printing.

ROUND SNAP-LOCK TOP

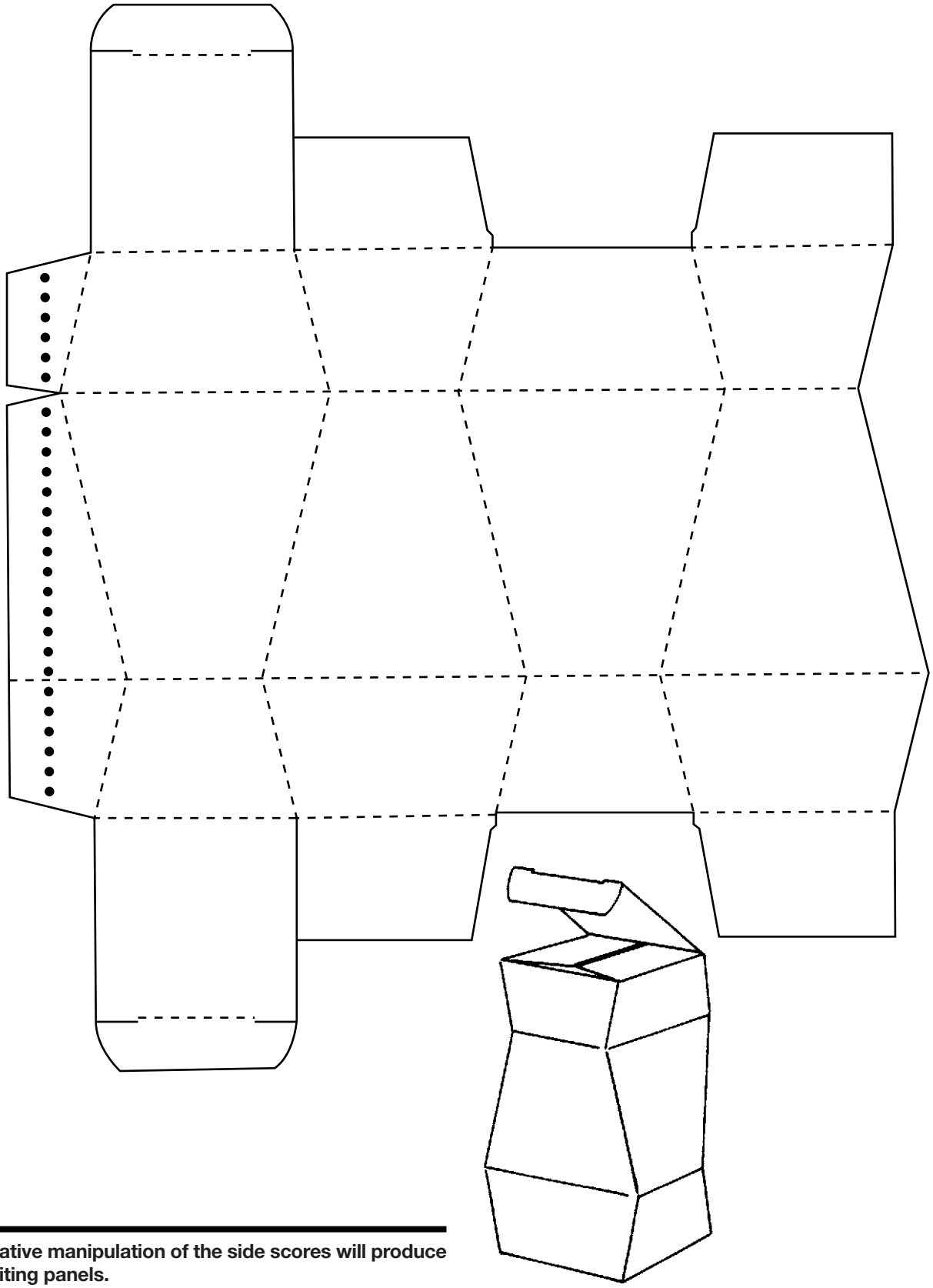




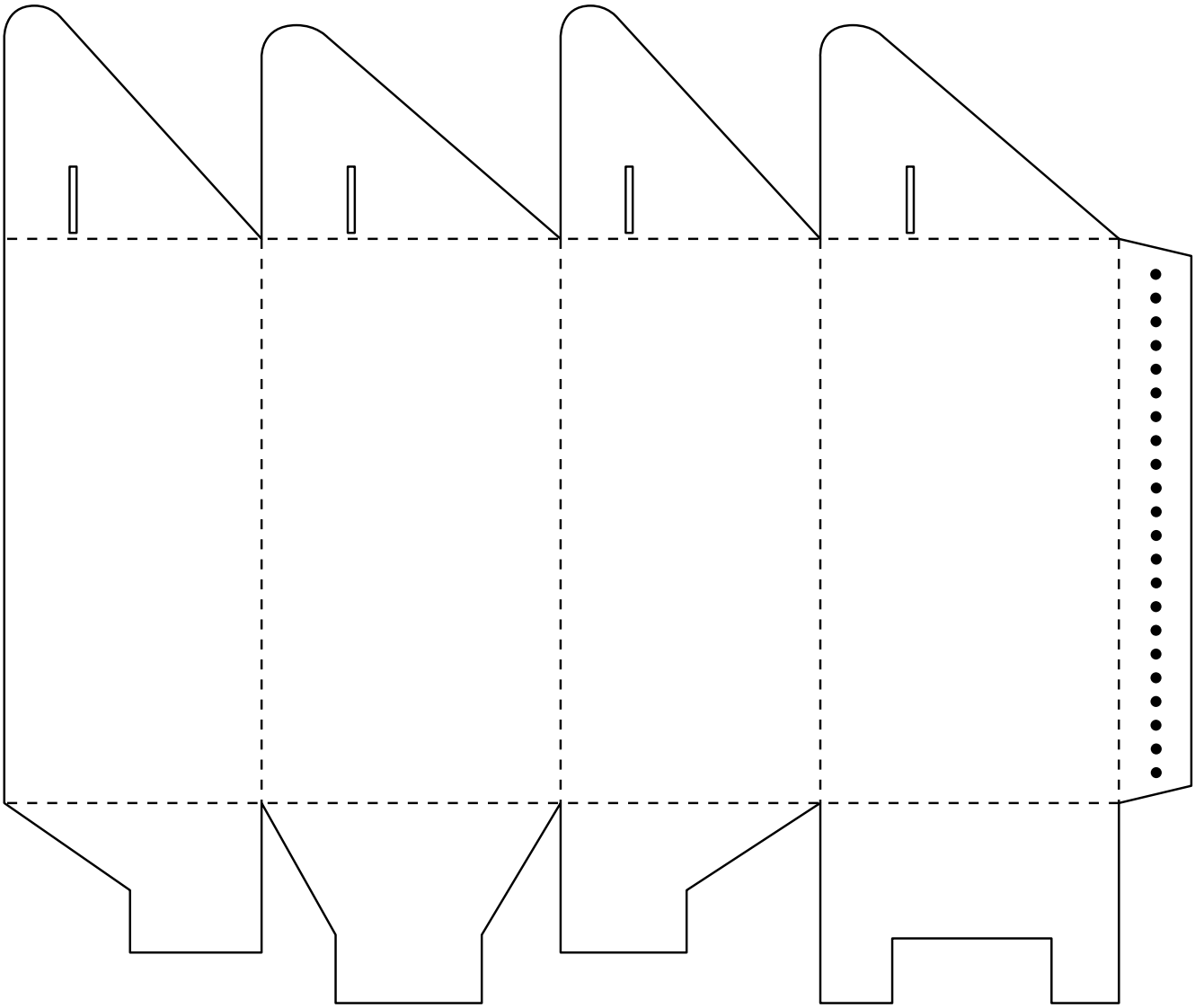


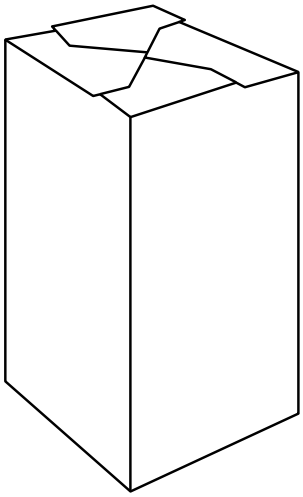


FACETED PANELS BOX



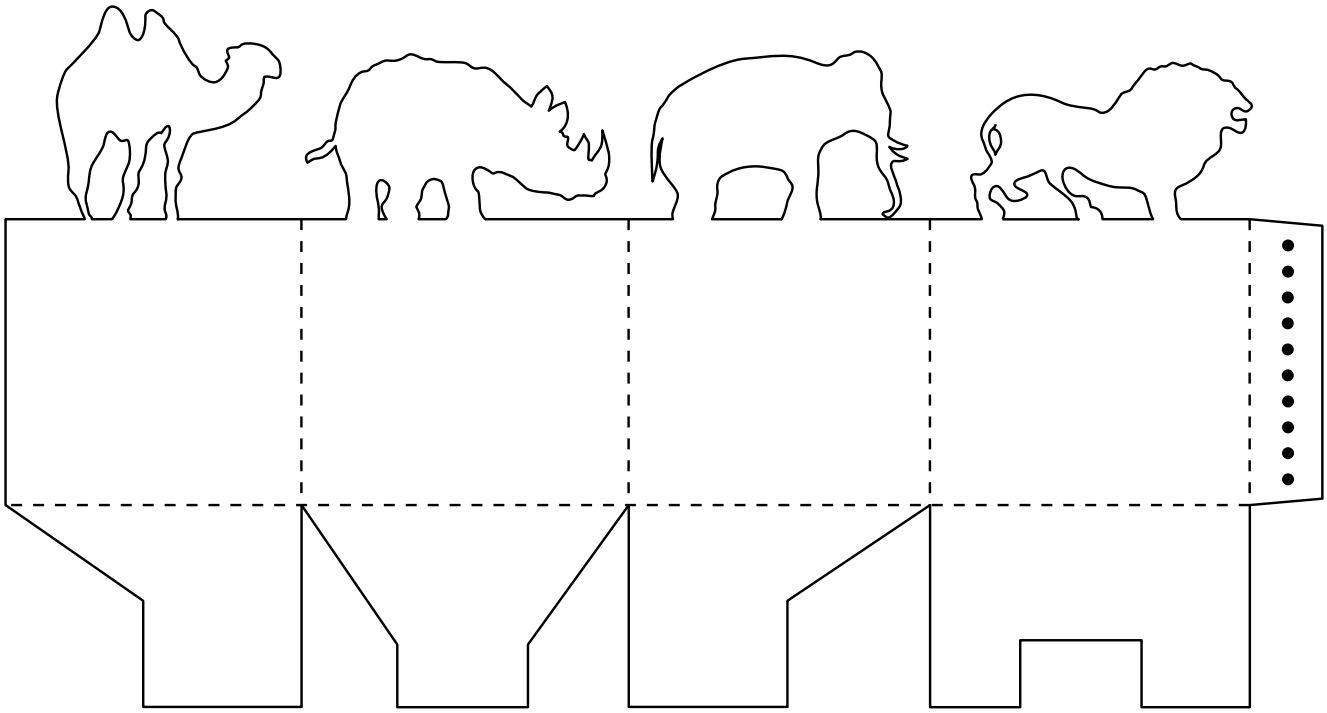
Creative manipulation of the side scores will produce exciting panels.

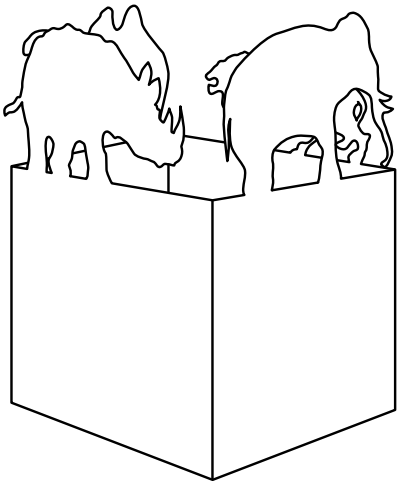


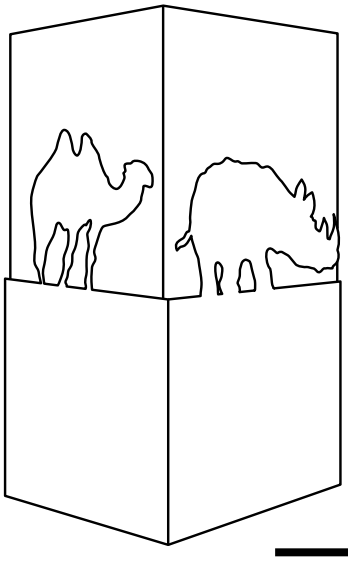


Use this box as a stand alone or in combination with the sleeve on the next page.

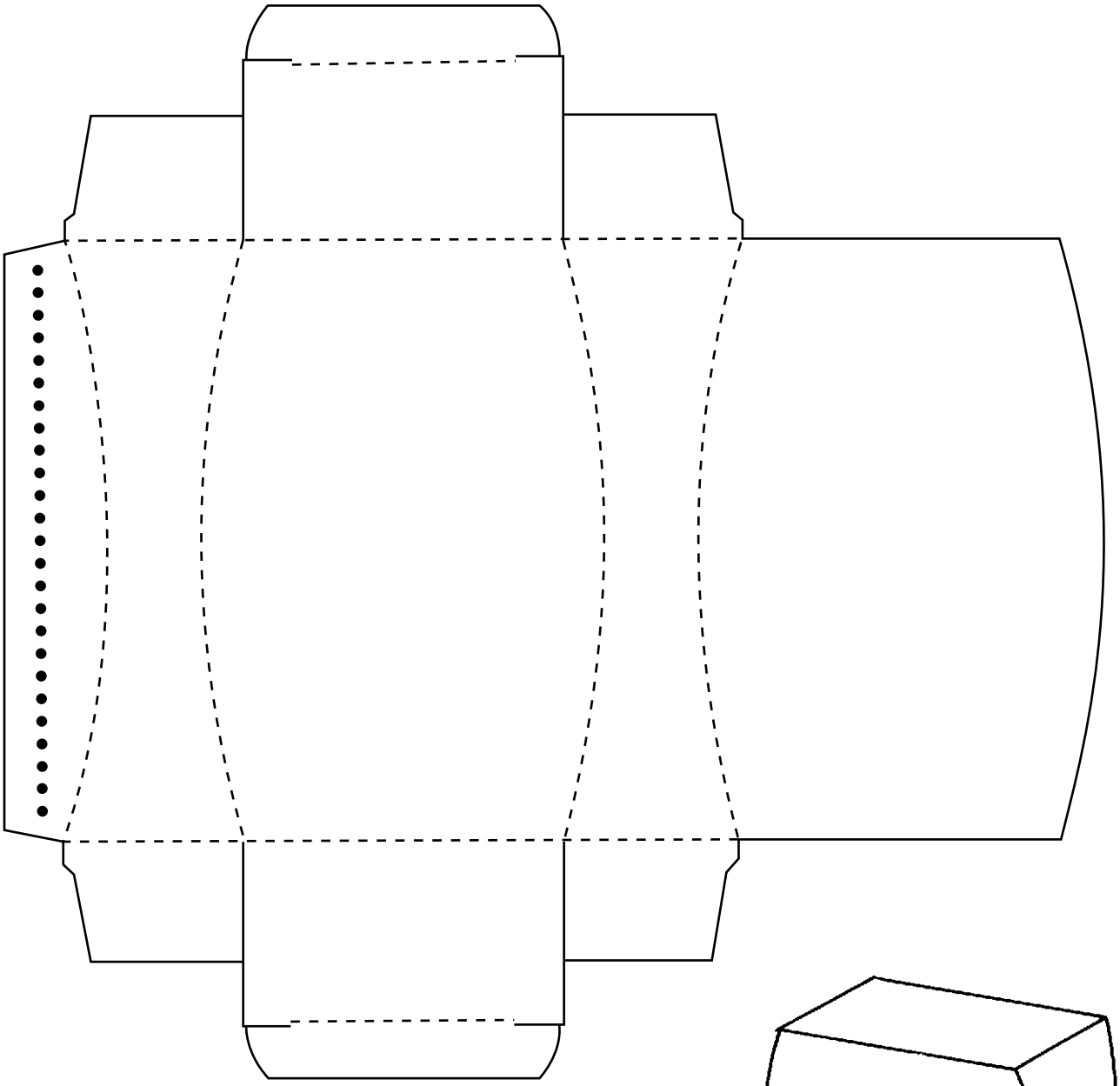
ANIMAL SLEEVE

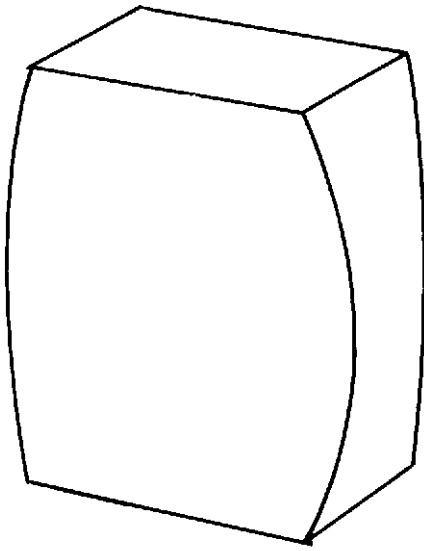






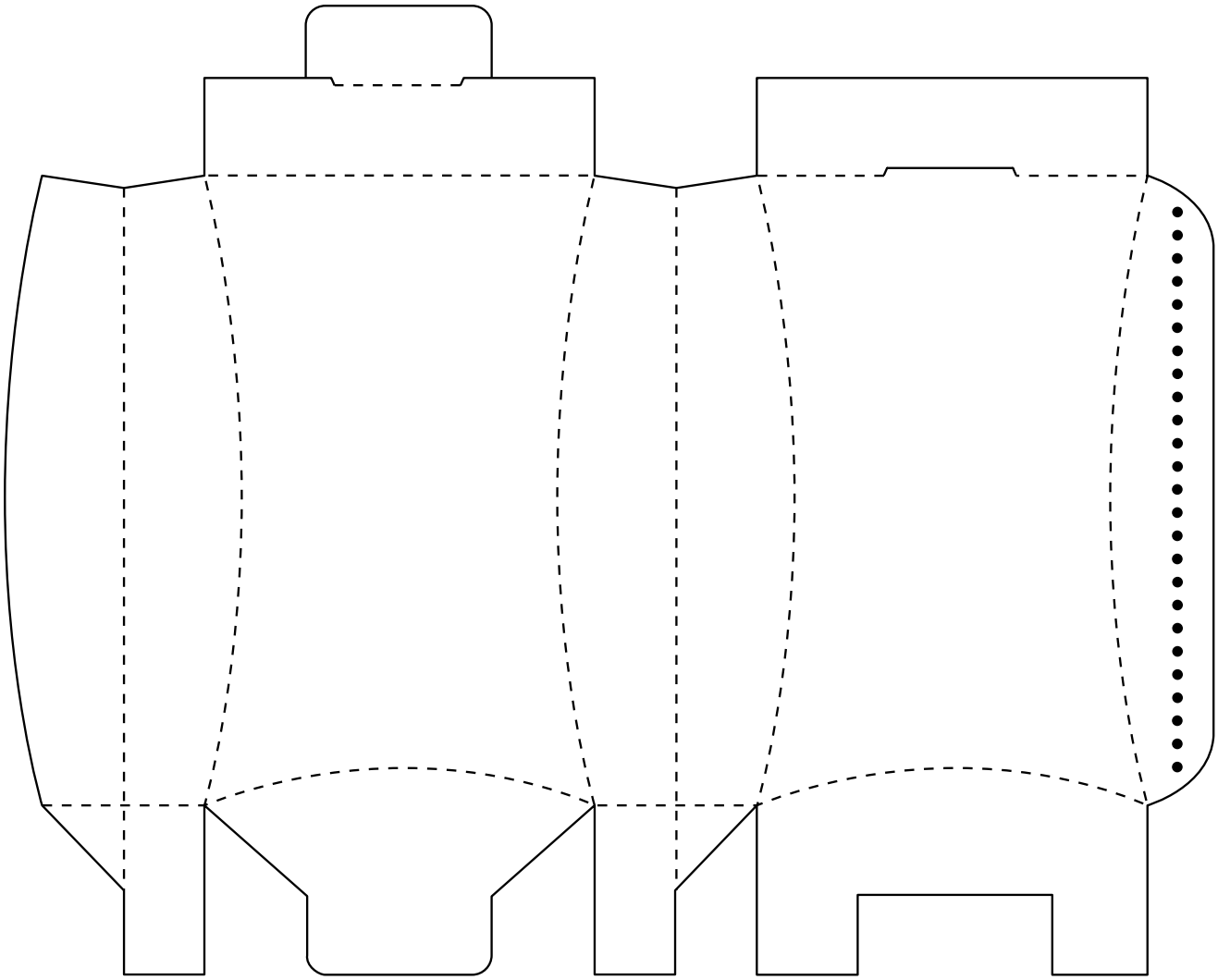
This is just one of the many design possibilities.

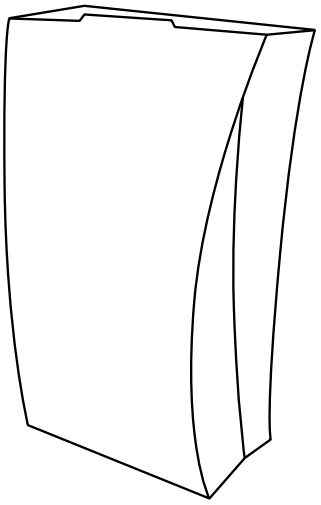


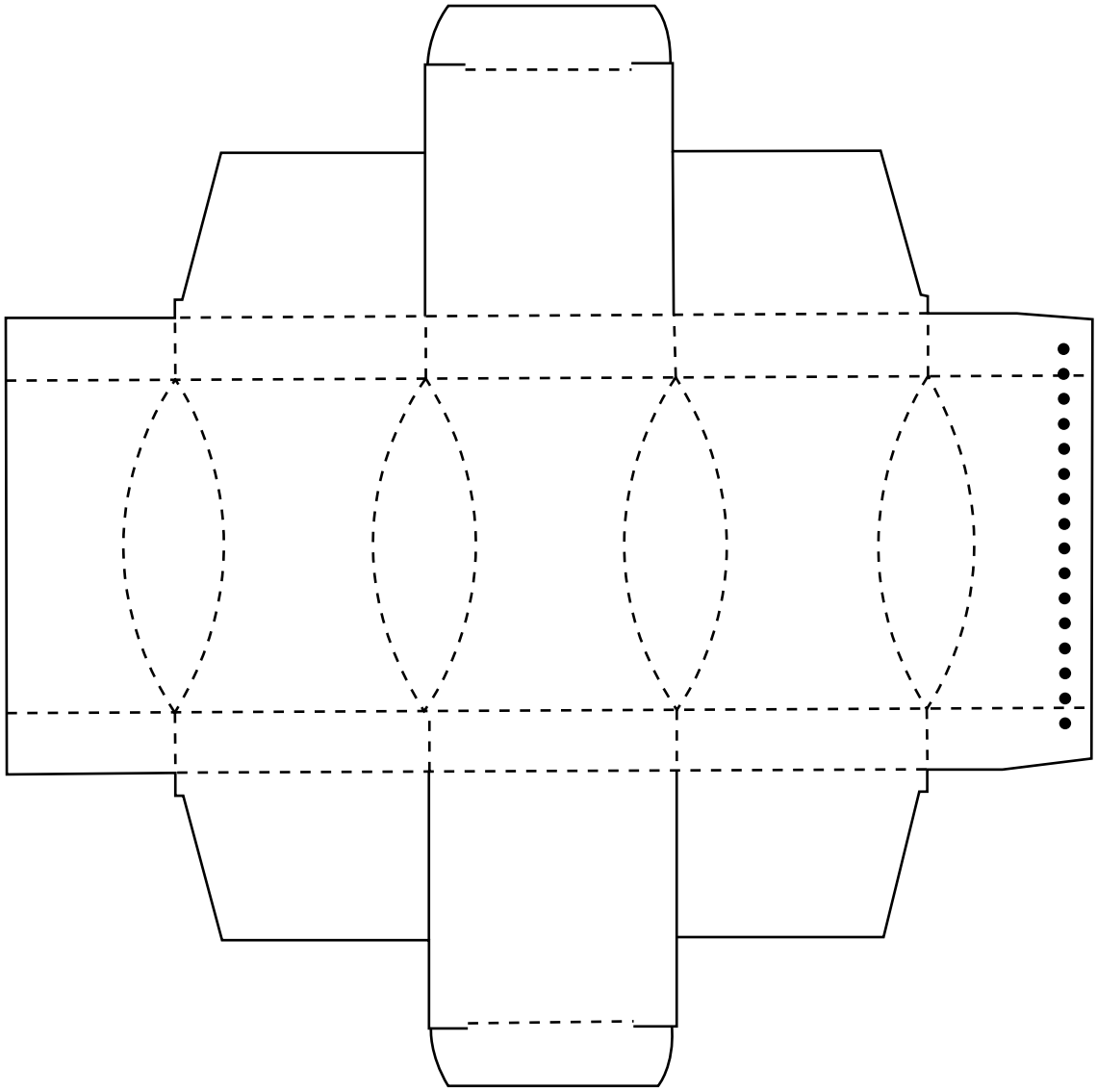


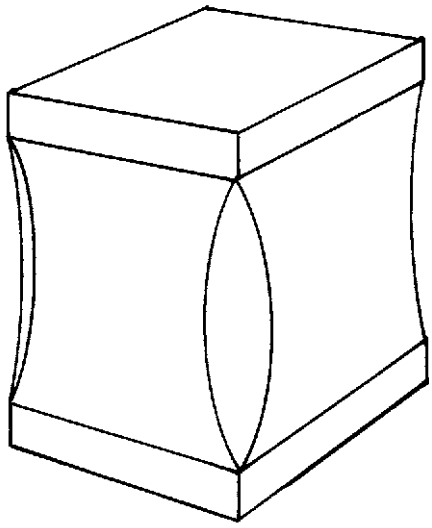
This straight tuck carton, with its concave front and back panels, has many design possibilities.

CONVEX/CONCAVE PACKAGE

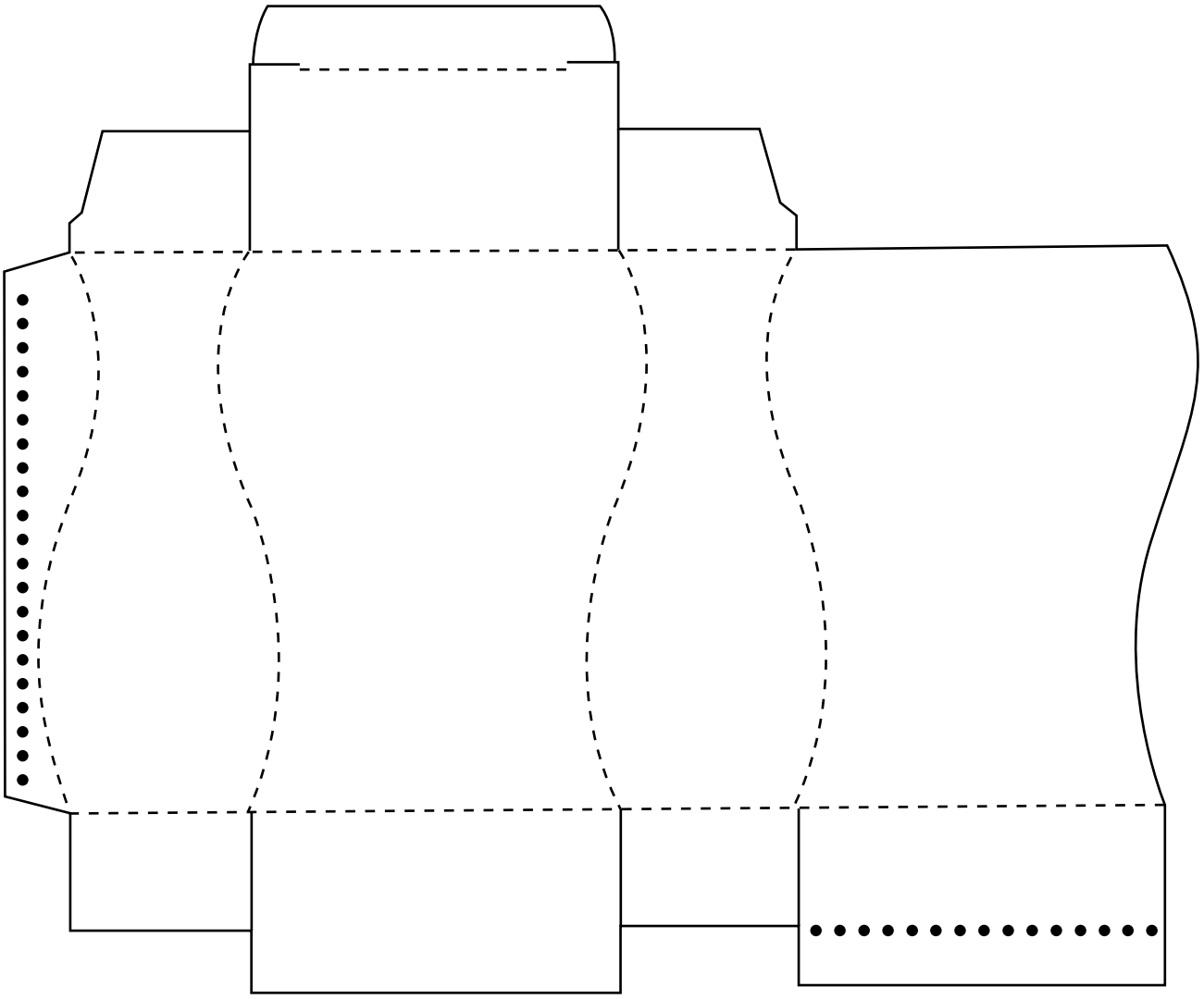


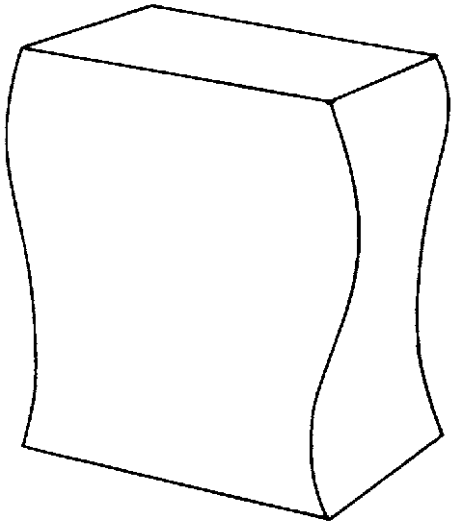




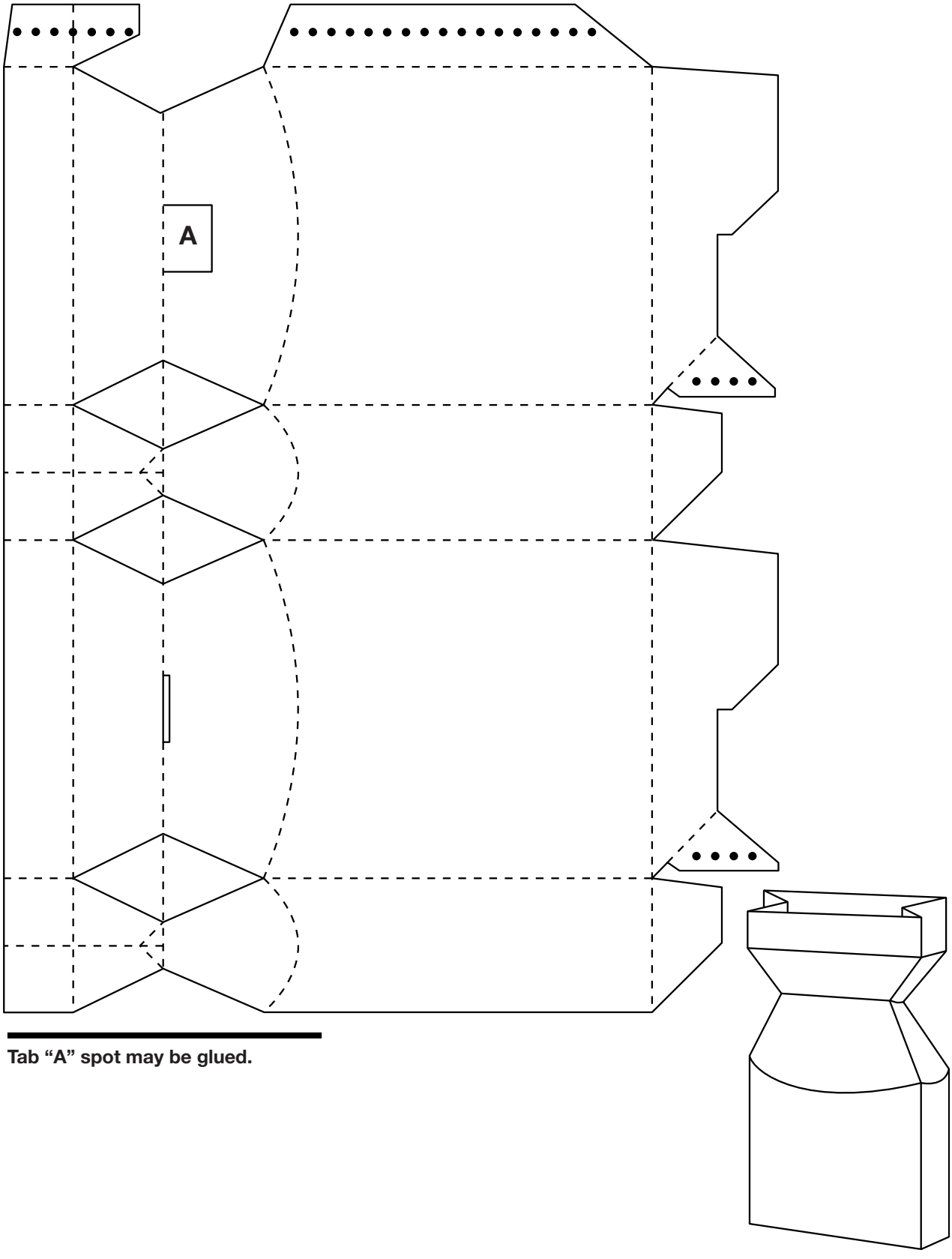


This pattern creates partial concave/convex front, side, and back panels.



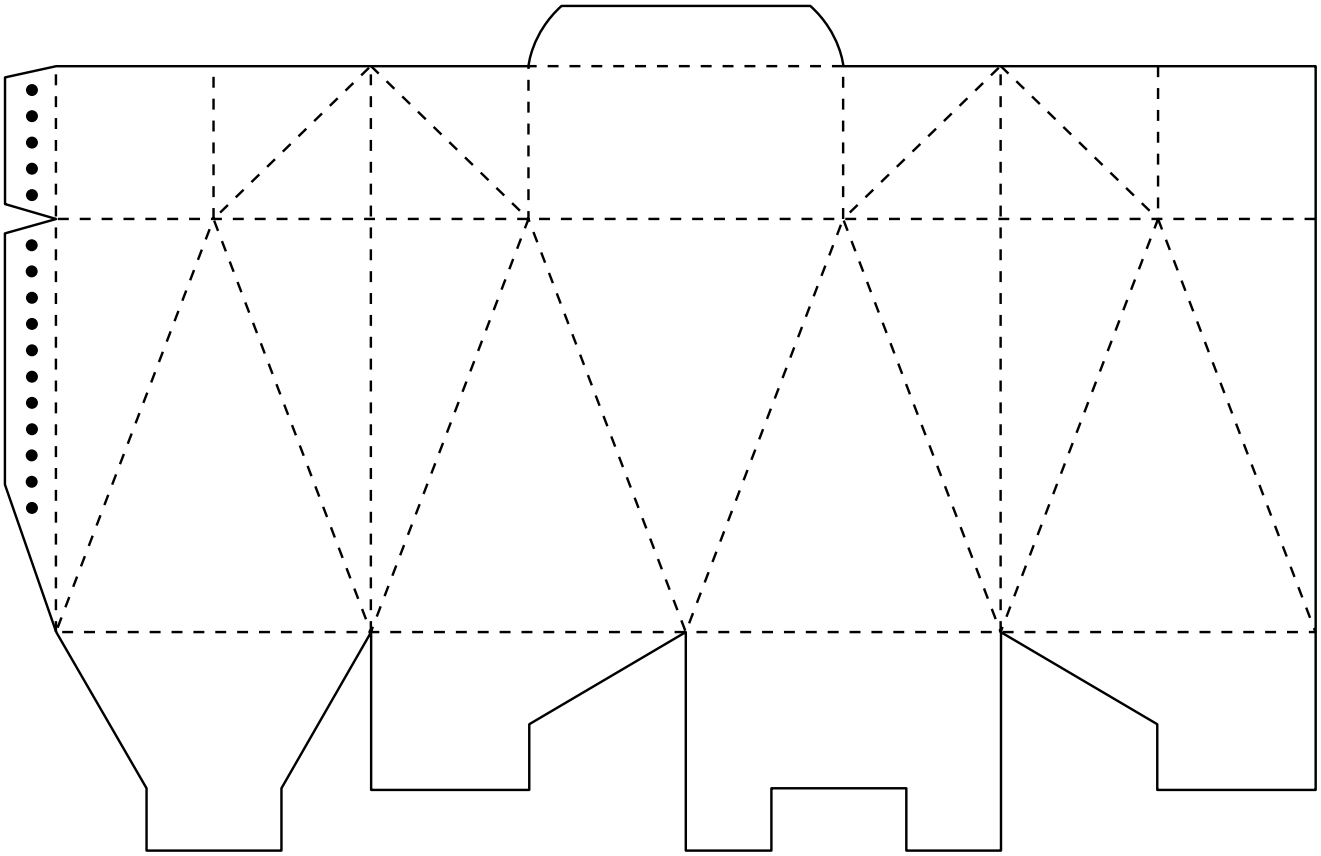


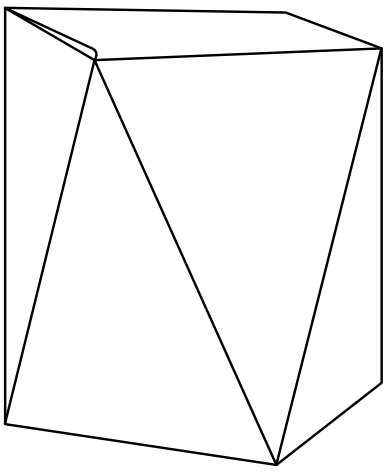
The many curves on this carton allow for a beautiful interplay of shadows.

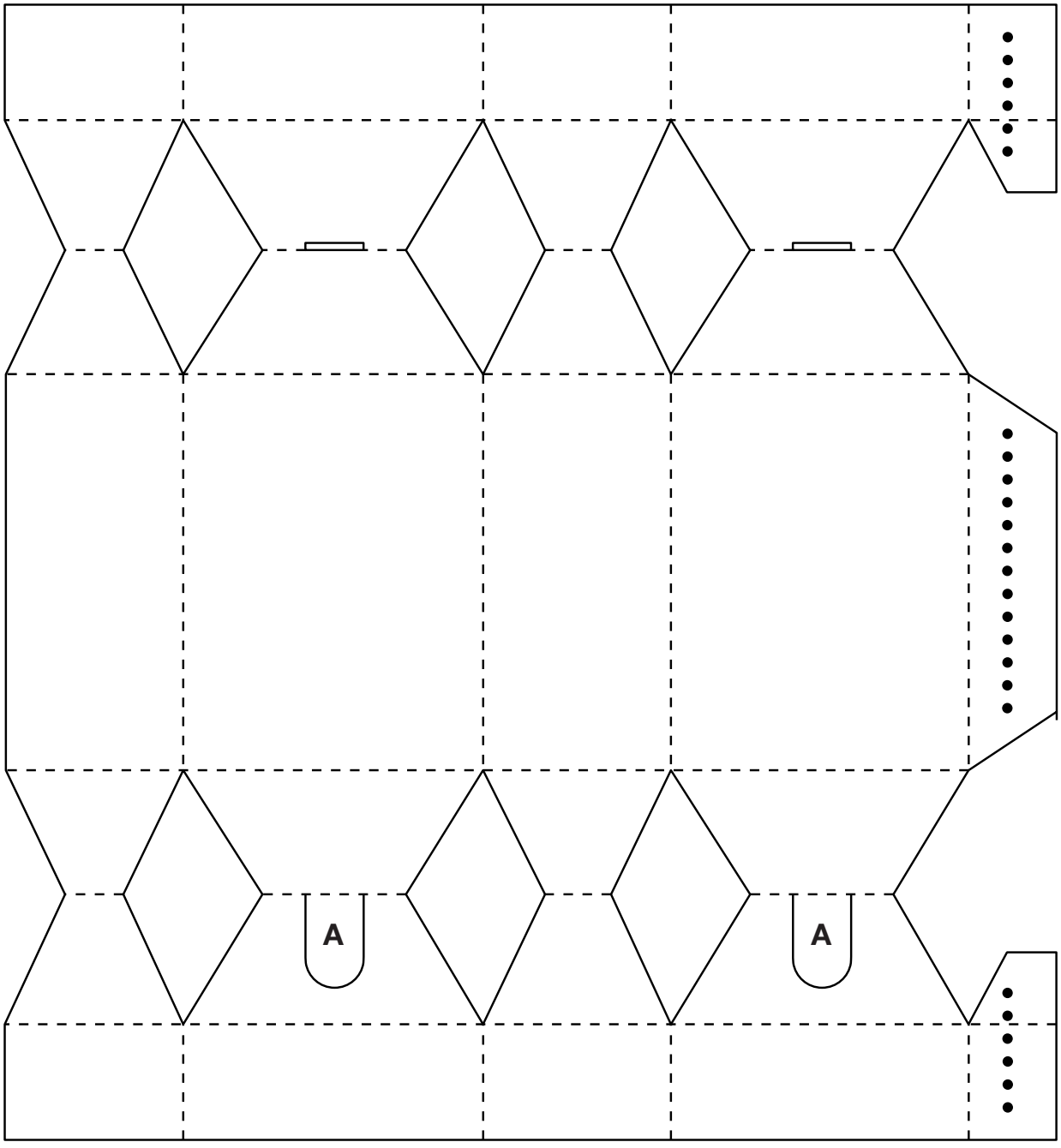


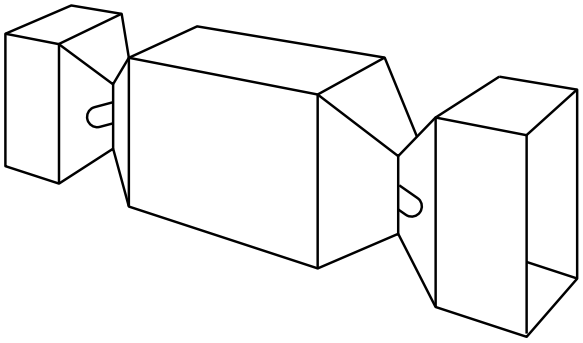
Tab “A” spot may be glued.

MULTIFACETED BOX



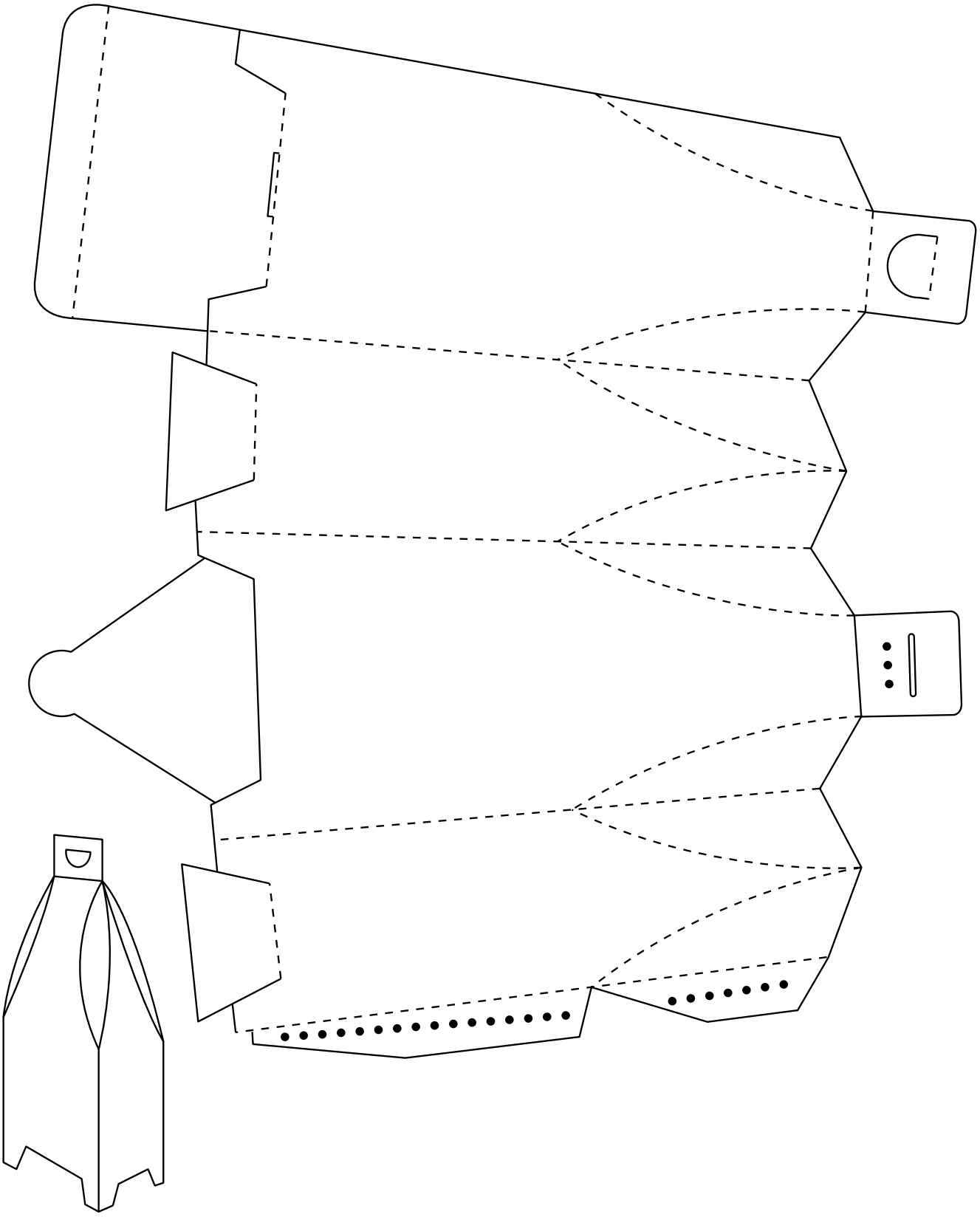


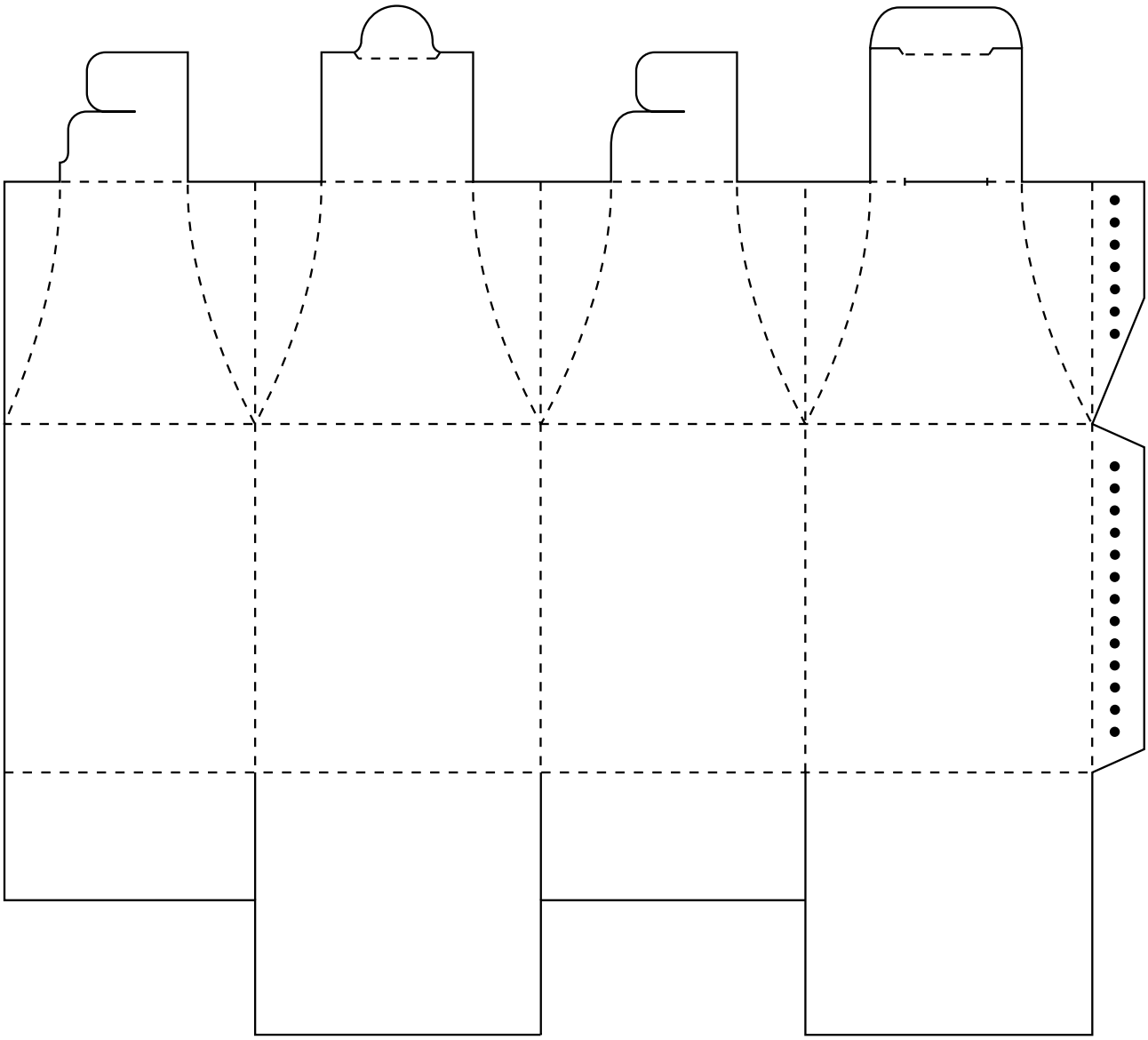


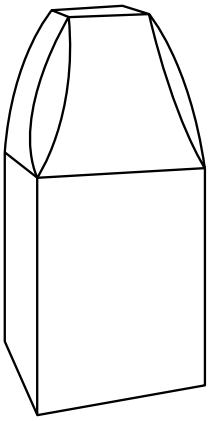


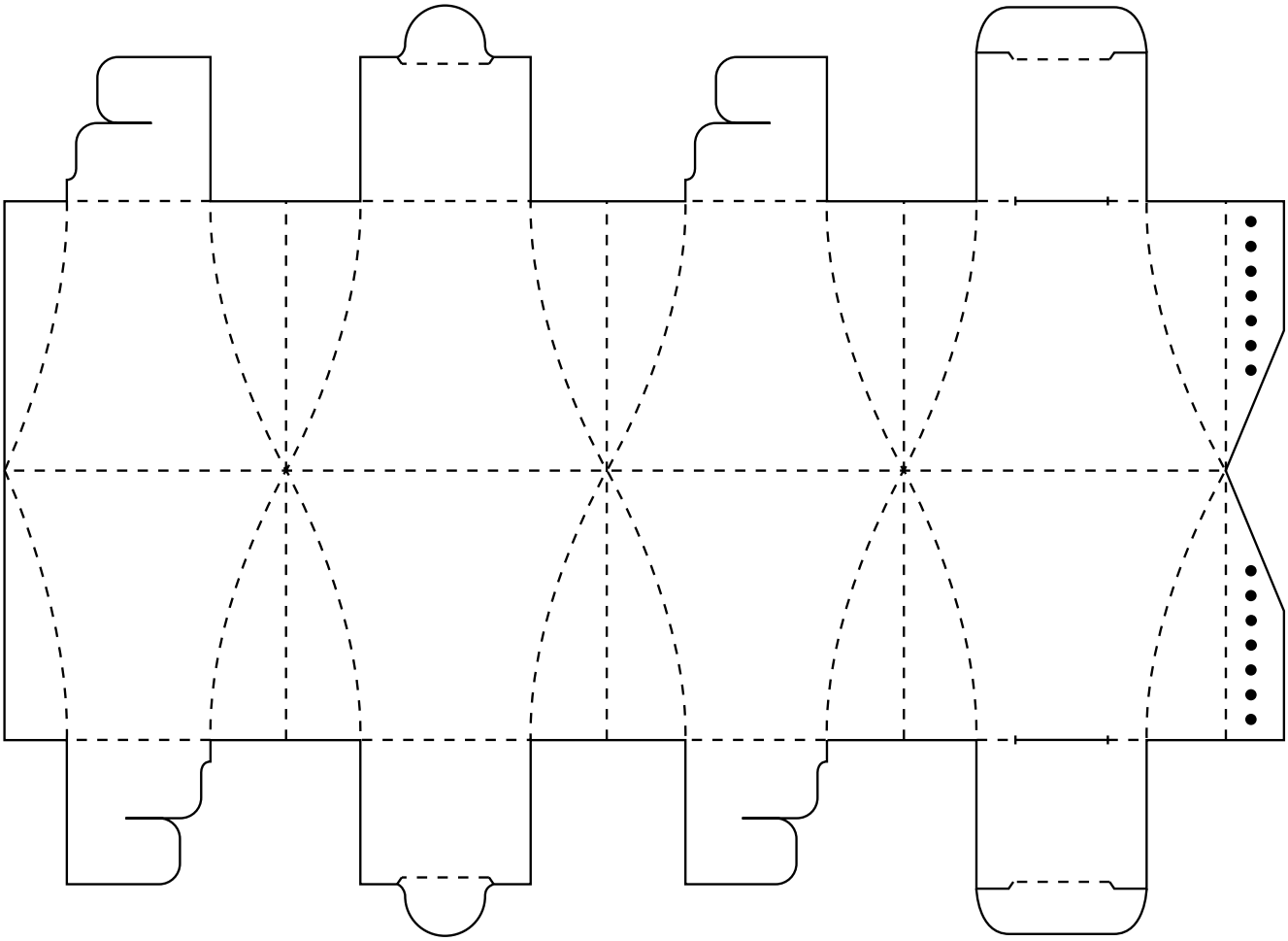
“A” tabs may be glued.

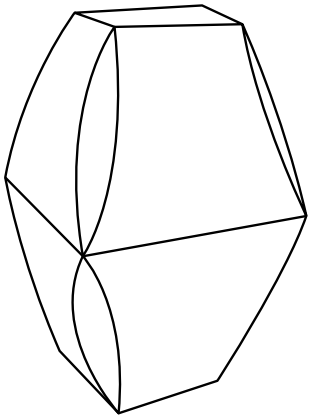
LANTERN-SHAPED CANDY BOX

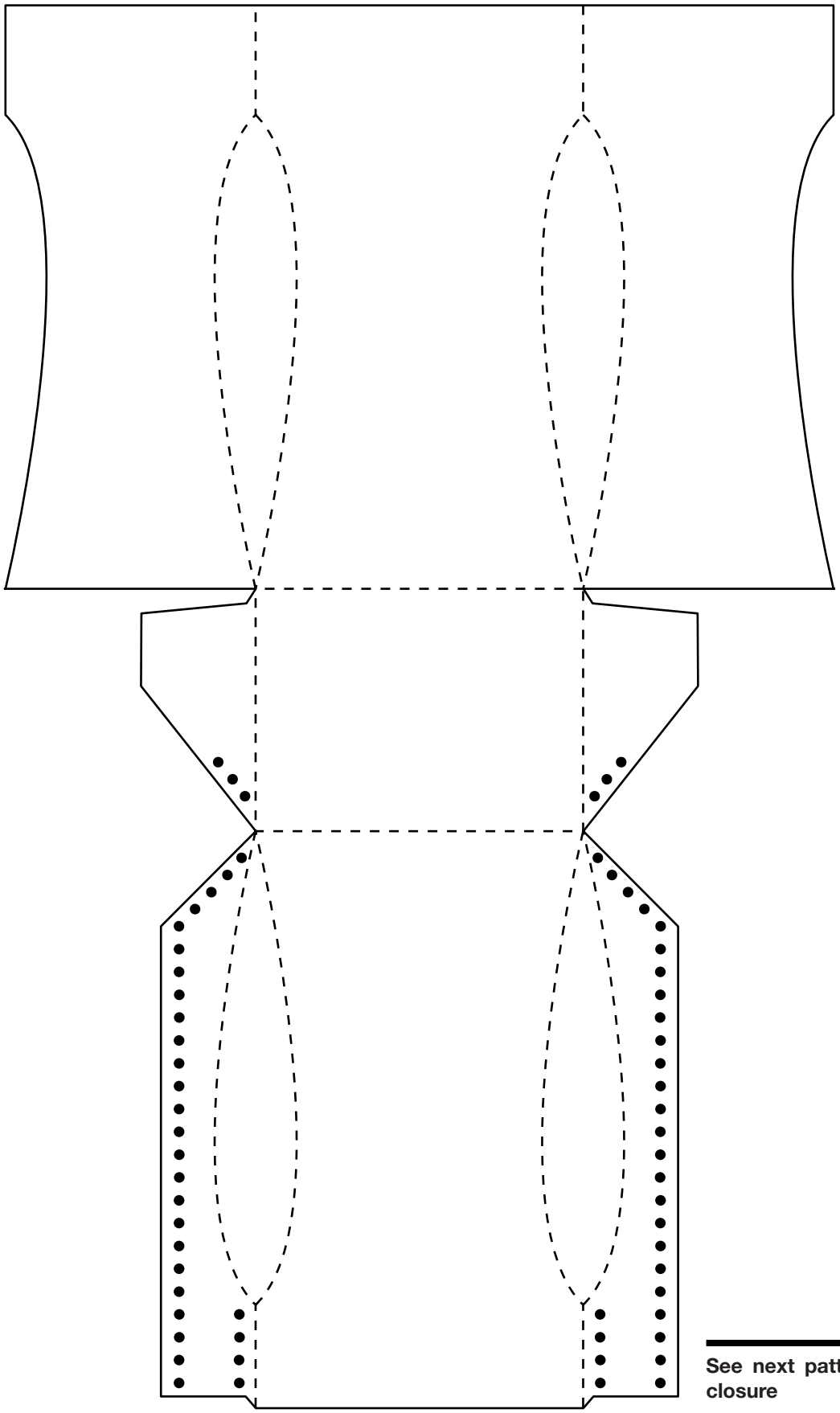






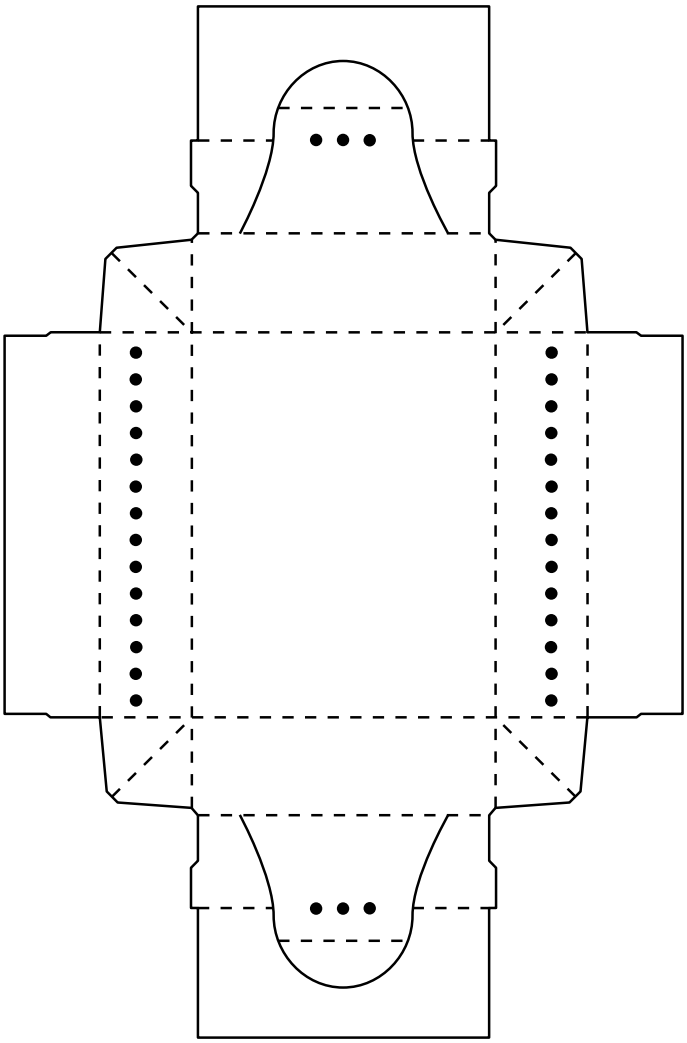


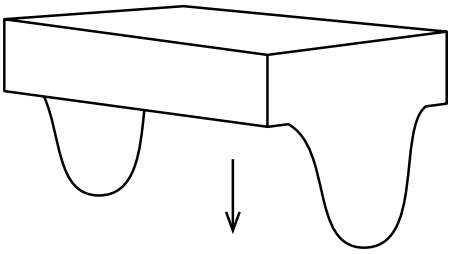


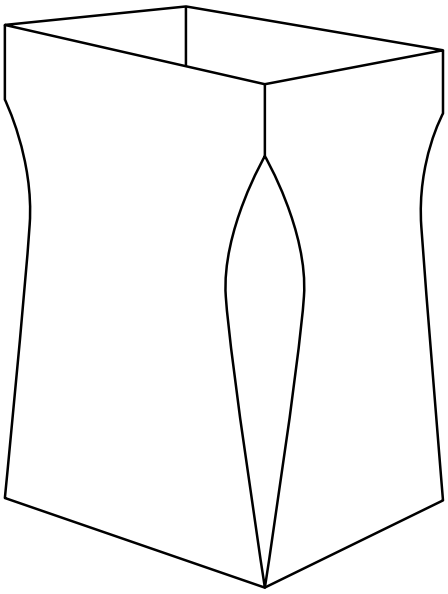


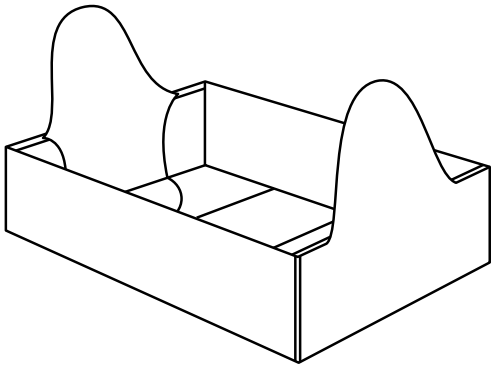
See next pattern for the closure

TOP FOR TUBE-STYLE CARTON (PREVIOUS PATTERN)

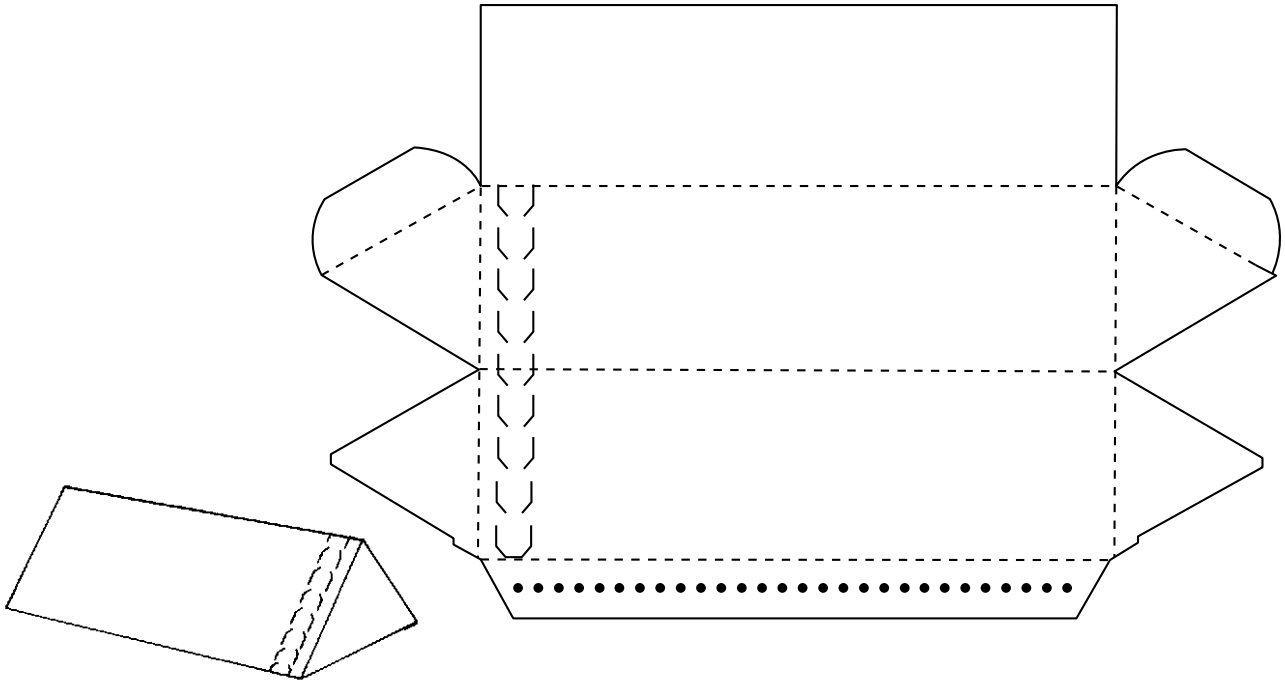




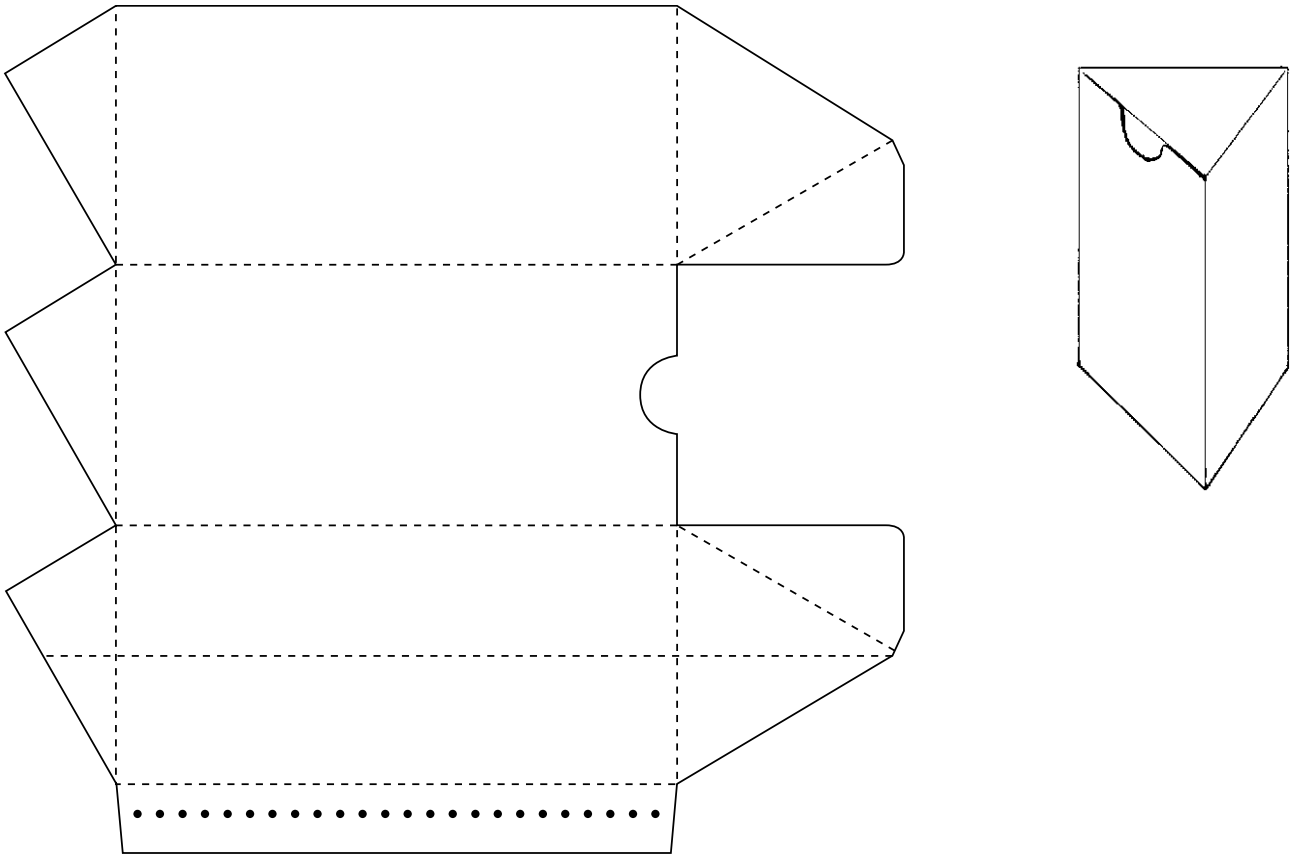




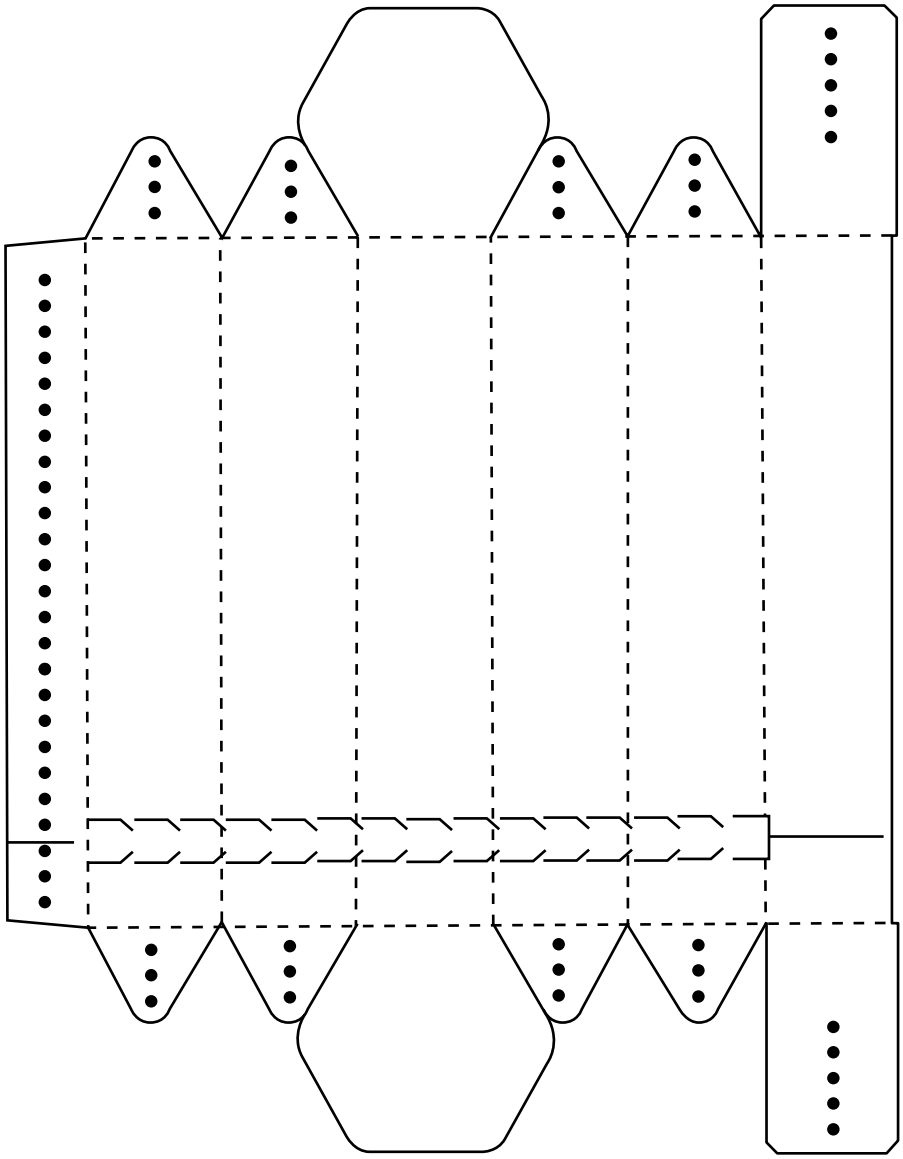
TRIANGLE WITH TUCK CLOSURES AND TEAR-AWAY ZIPPER STRIP

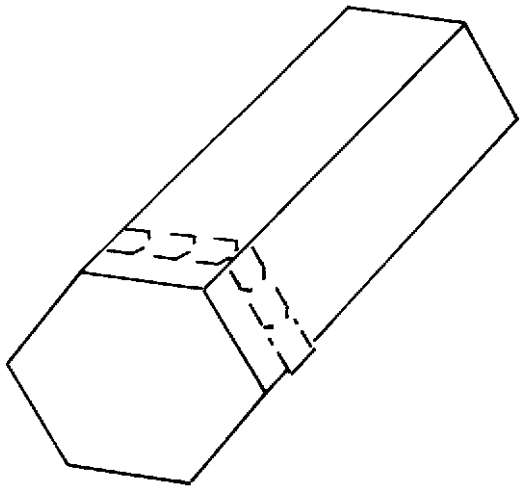


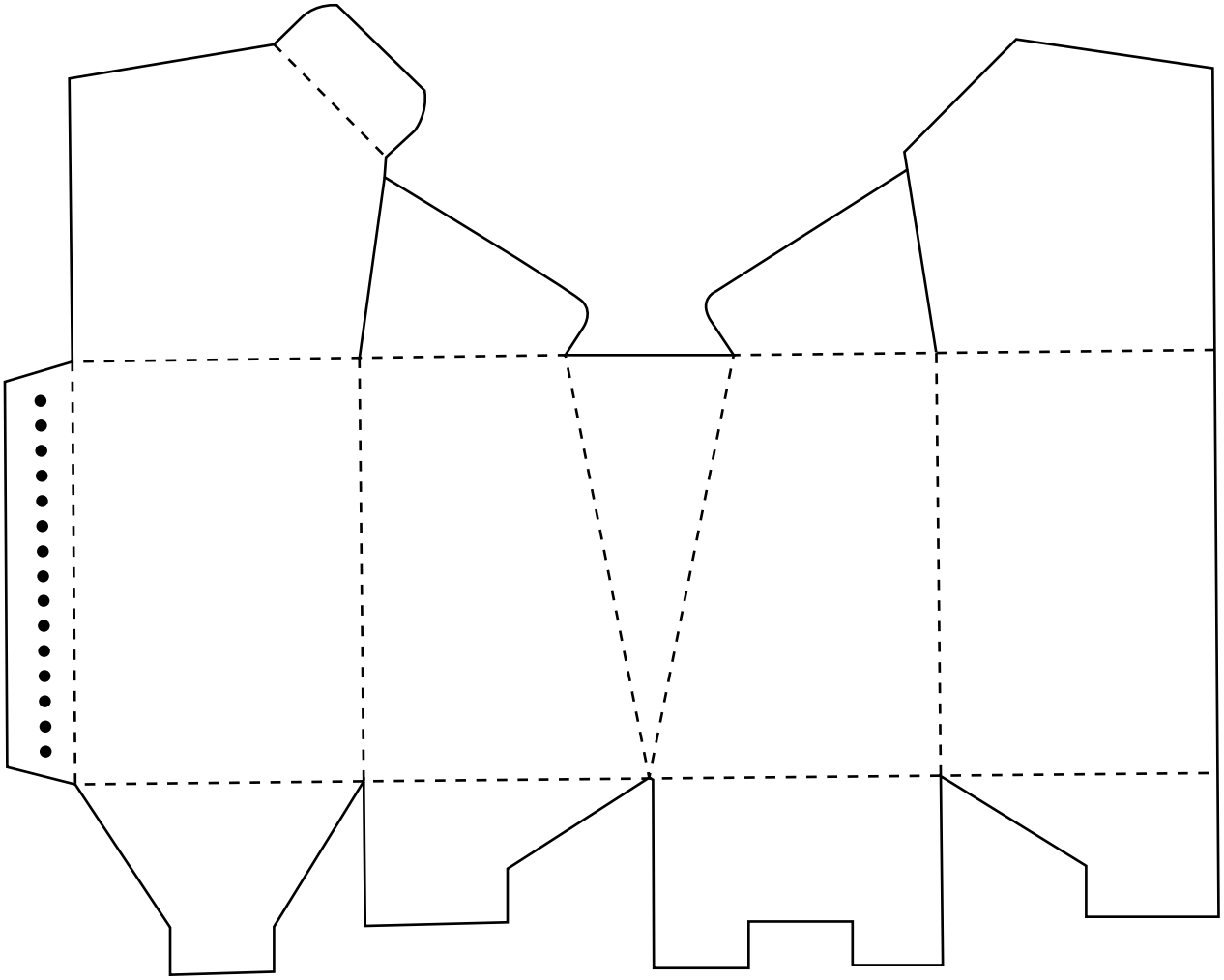
TRIANGLE WITH AUTO-LOCK BOTTOM

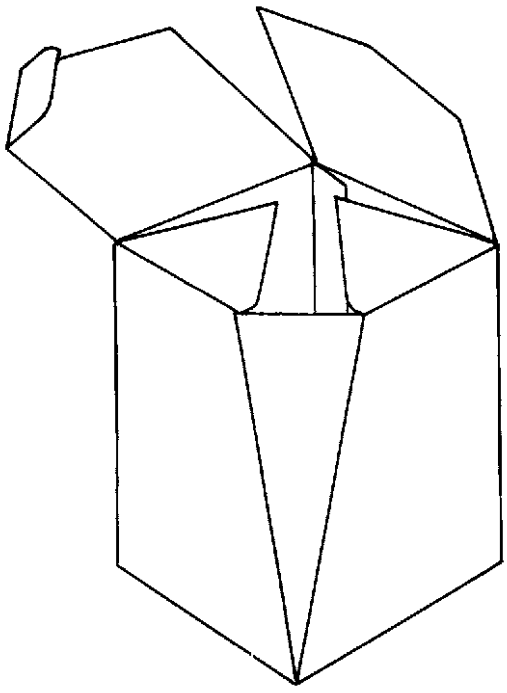


HEXAGON WITH TEAR-STRIP ZIPPER



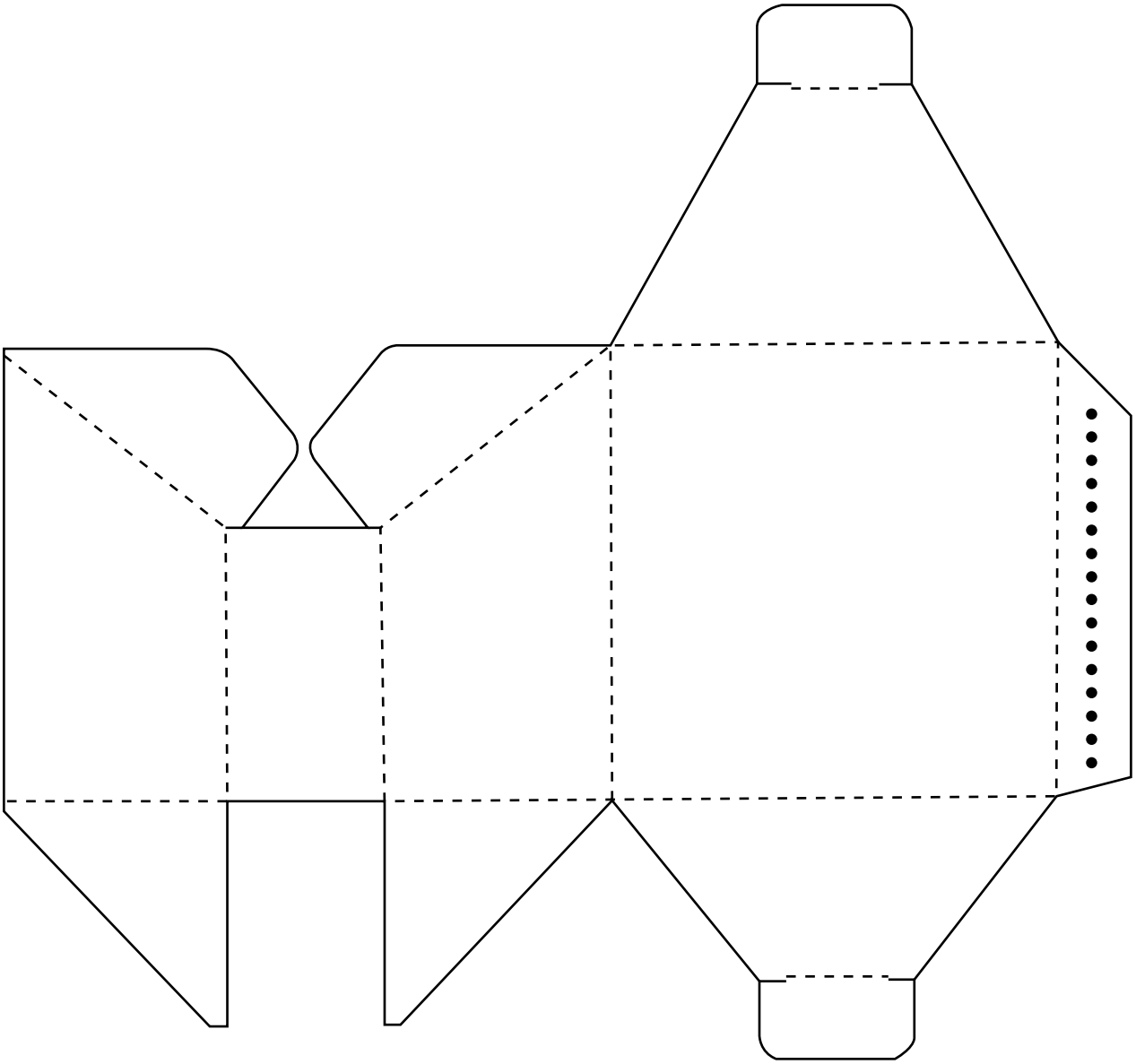


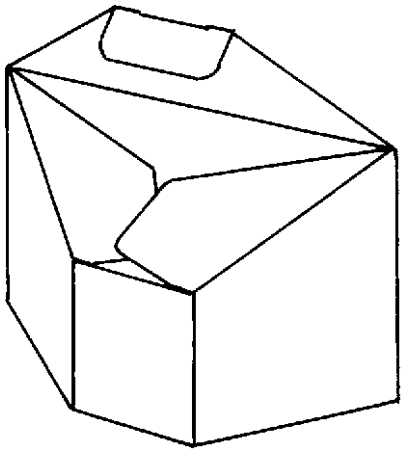




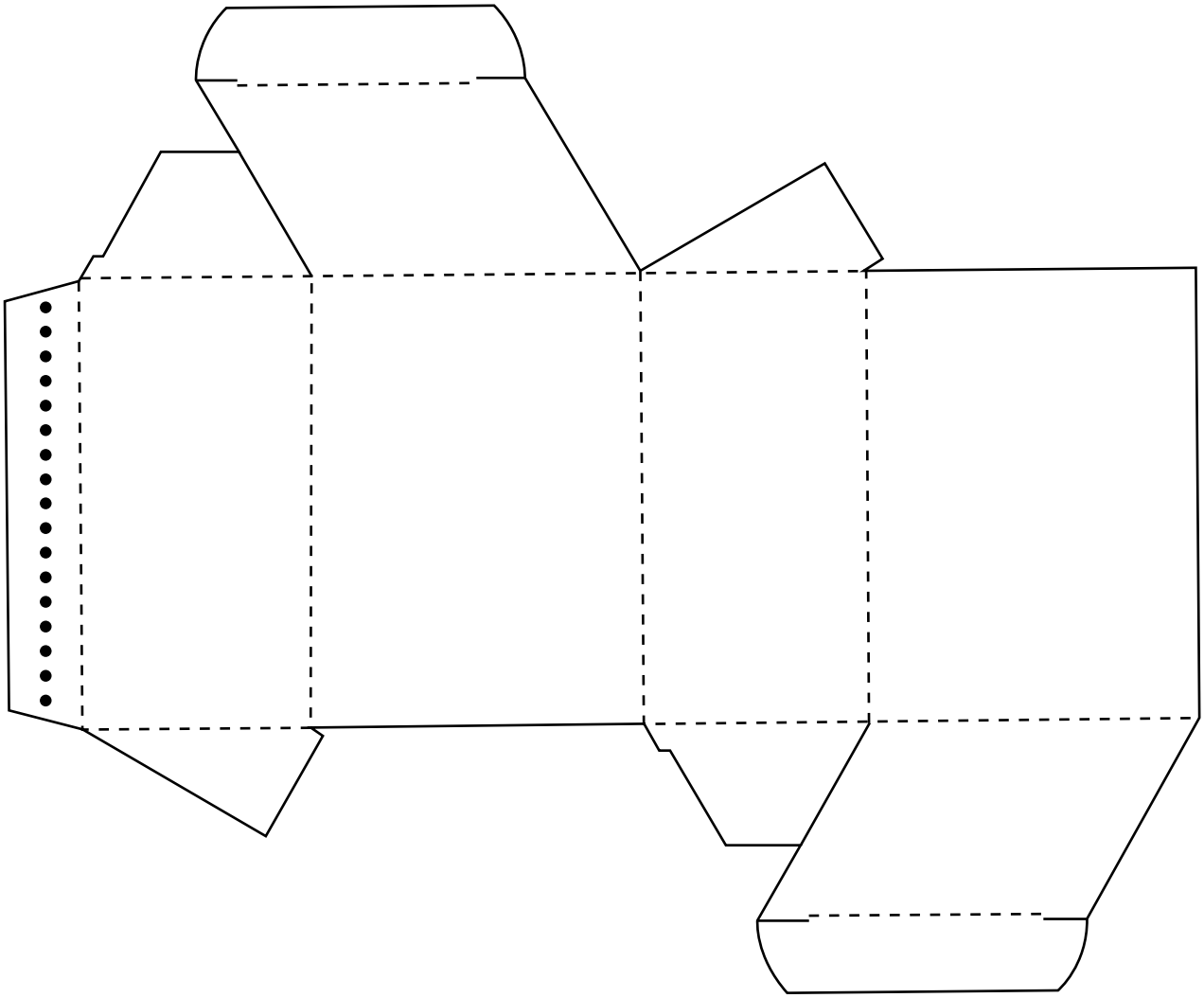
The scores in the panels create a fifth riser panel on this carton.

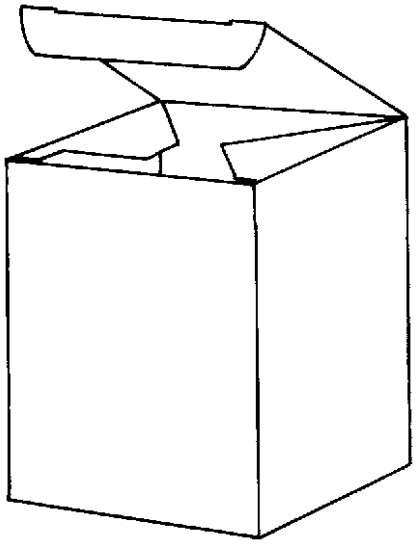
SLANTED TOP BOX



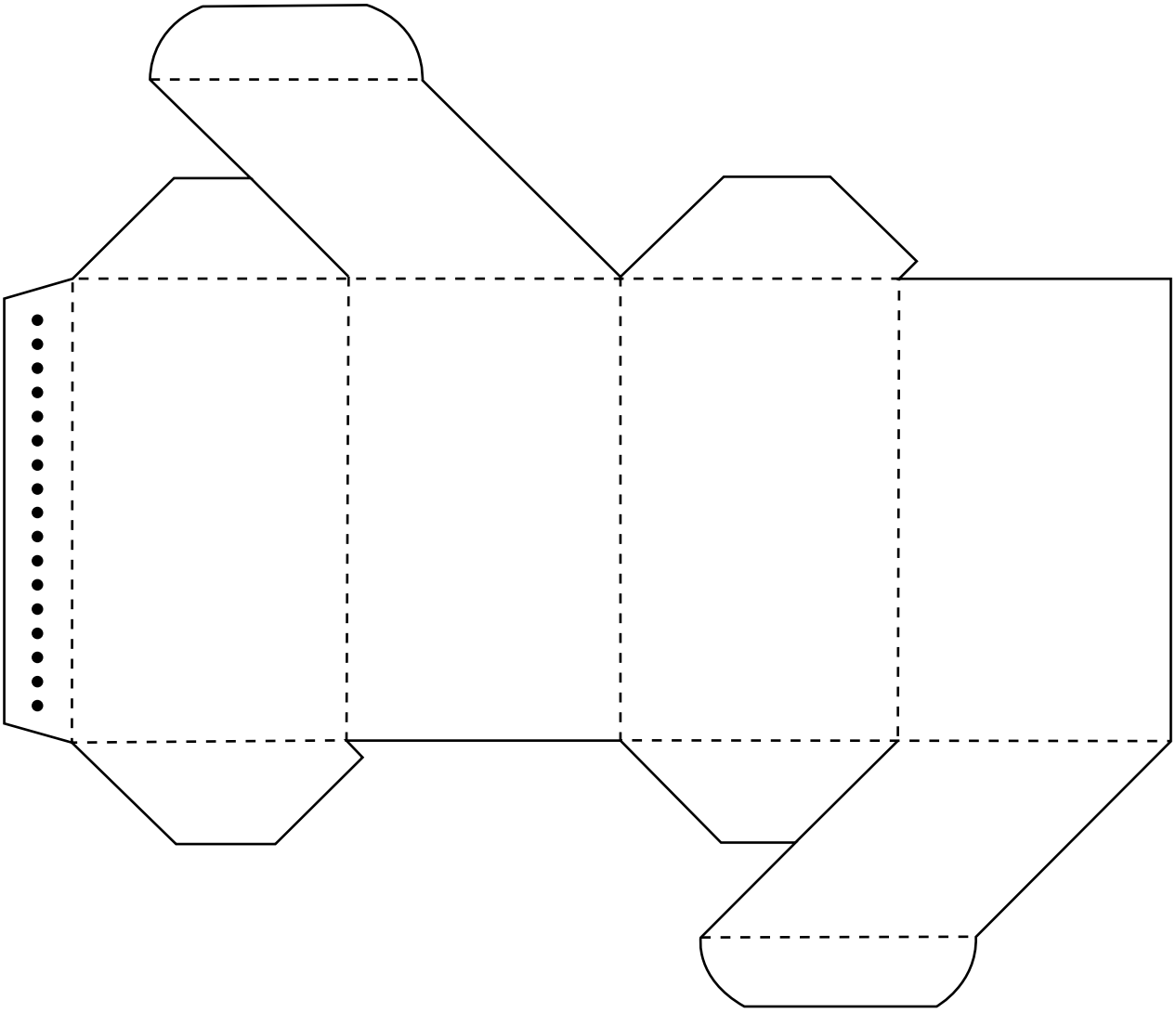


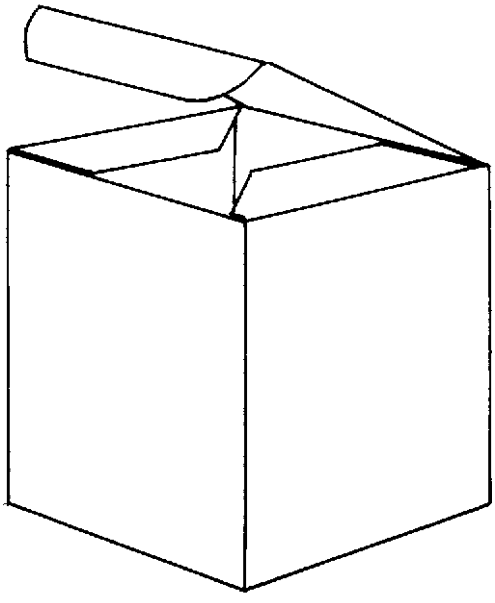
The side and top panels of this carton allow for great graphic visibility.



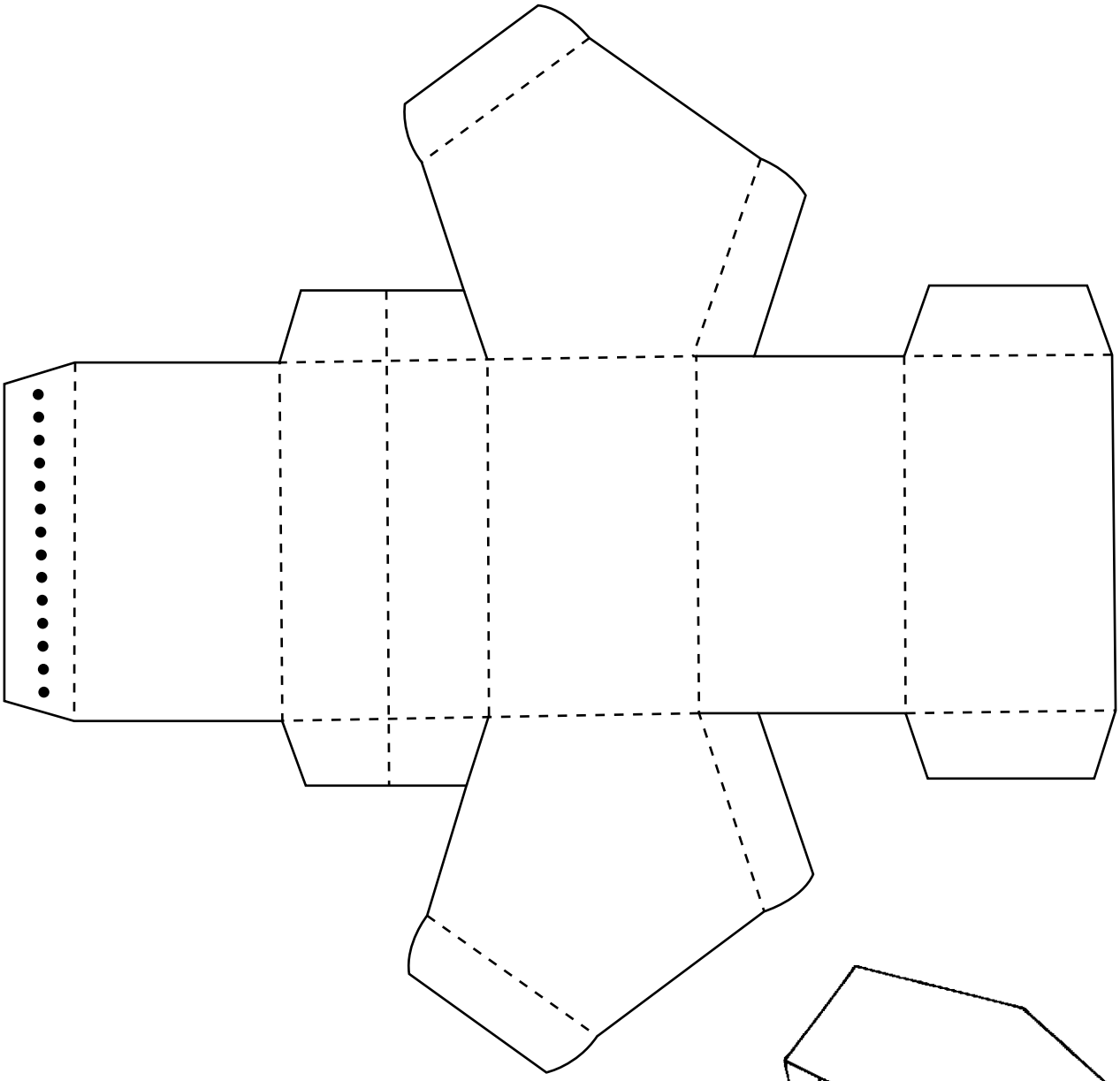


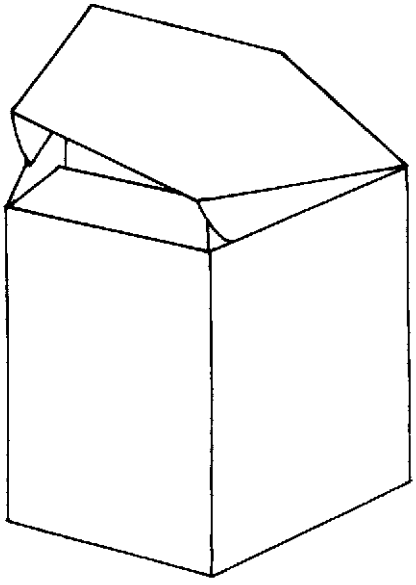
REVERSE TUCK DIAMOND-SHAPED CARTON





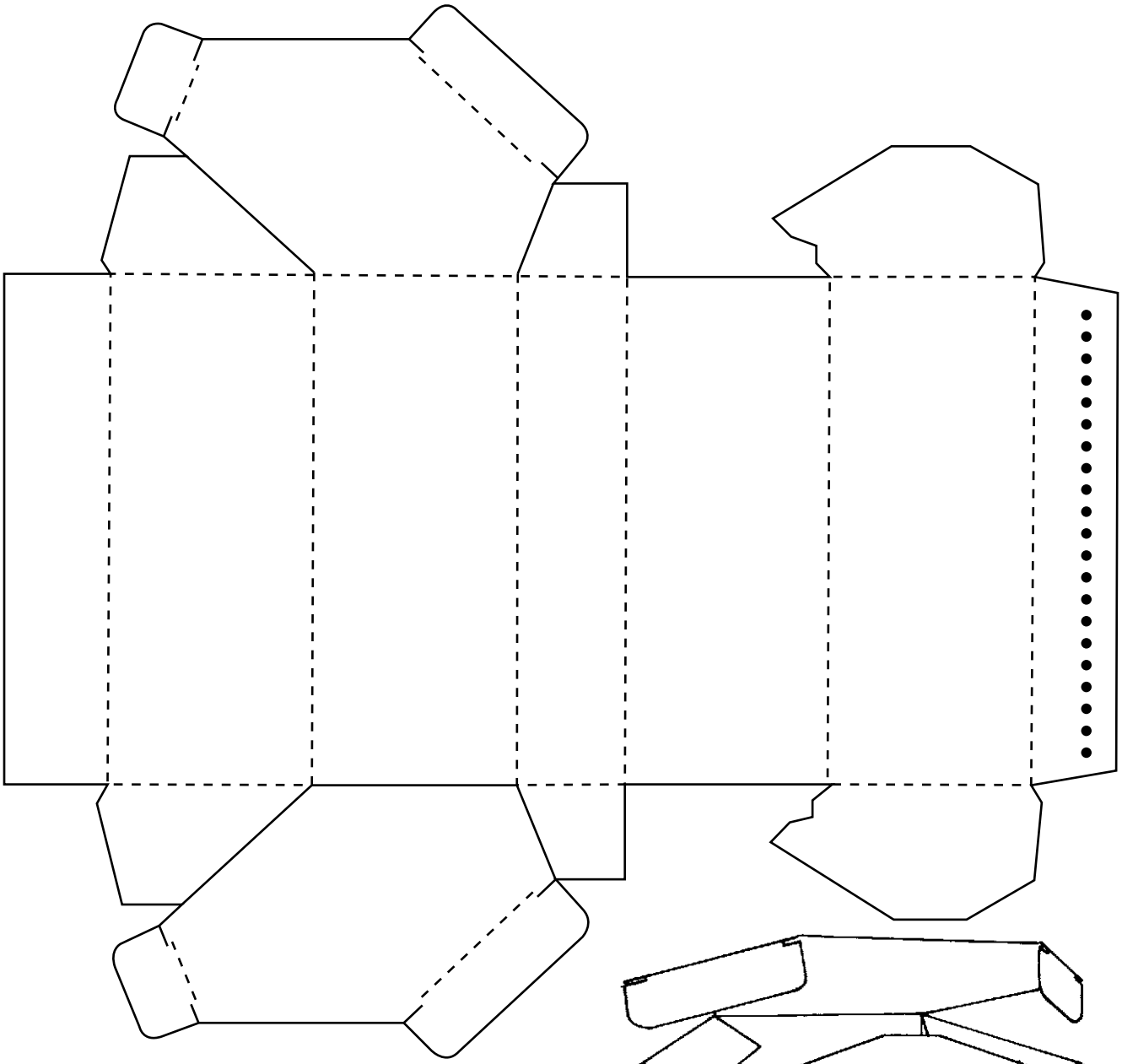
PENTAGON WITH TUCKS

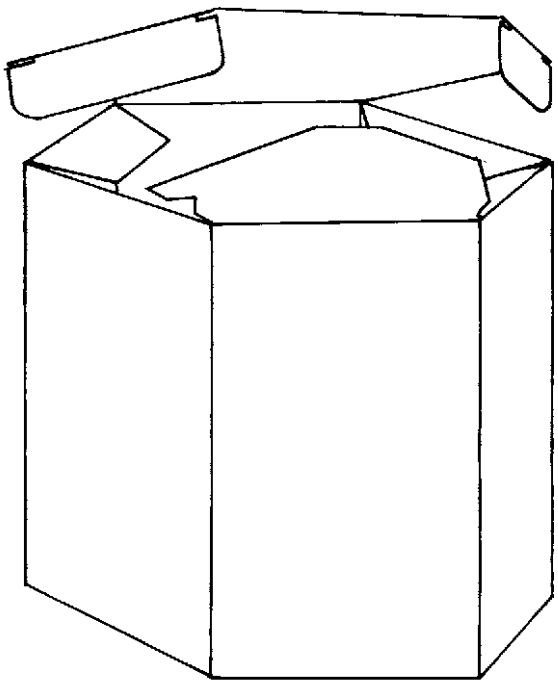


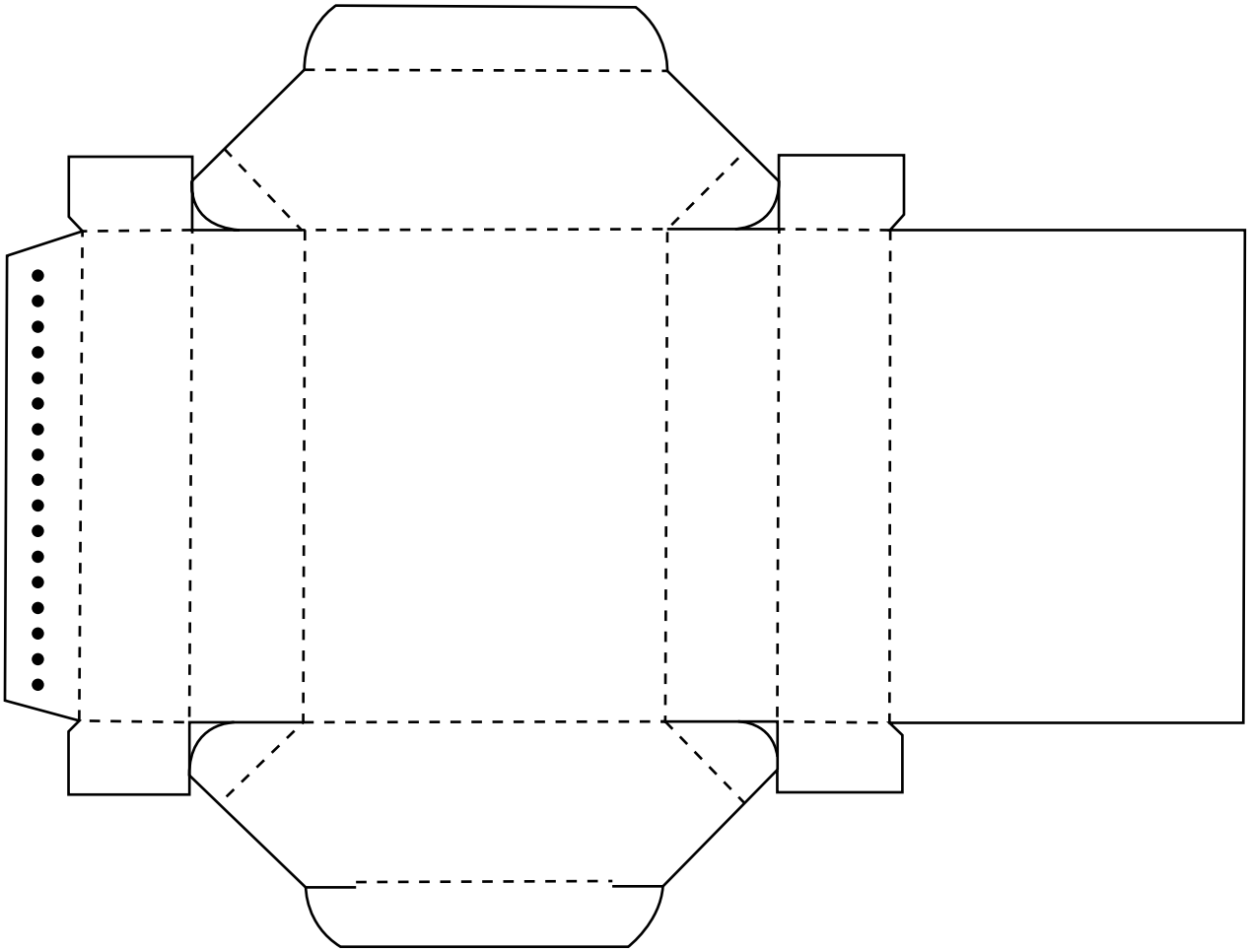


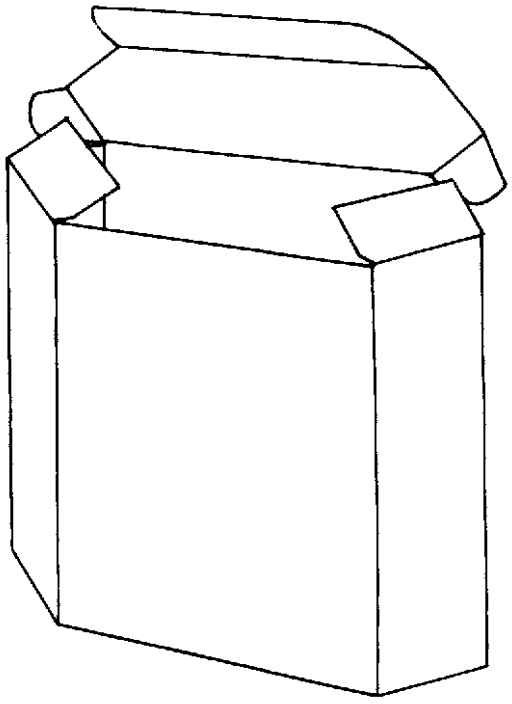
The additional score would be needed in order to ship the carton flat.

SIX-SIDED CARTON WITH STRAIGHT TUCKS
(PAT #3,148,443)



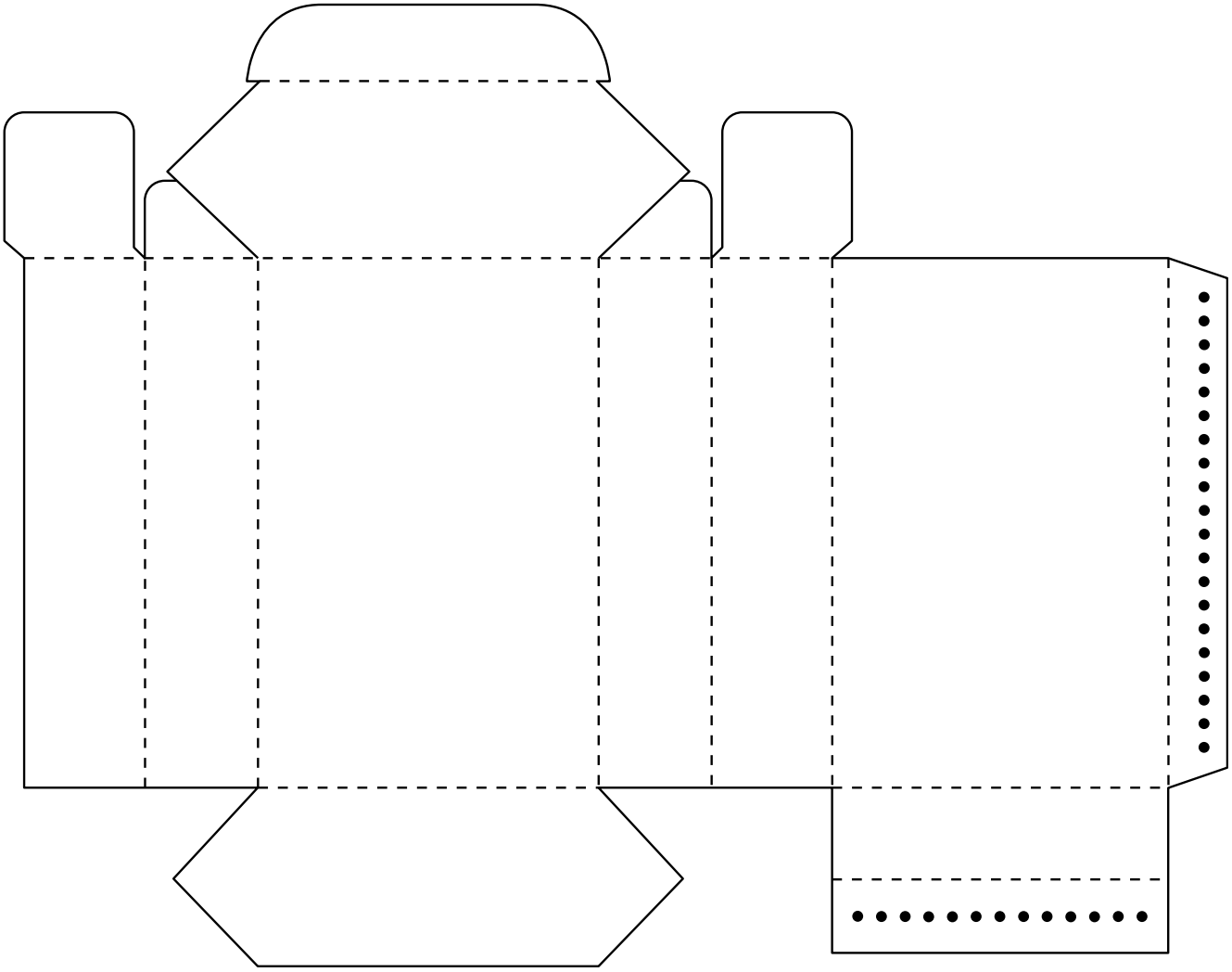


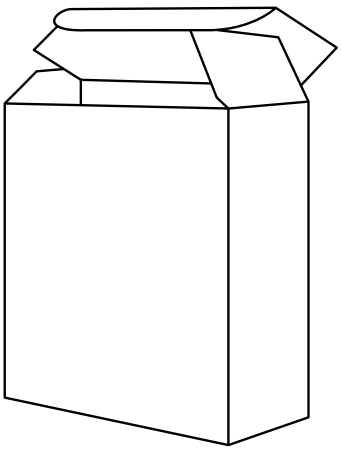




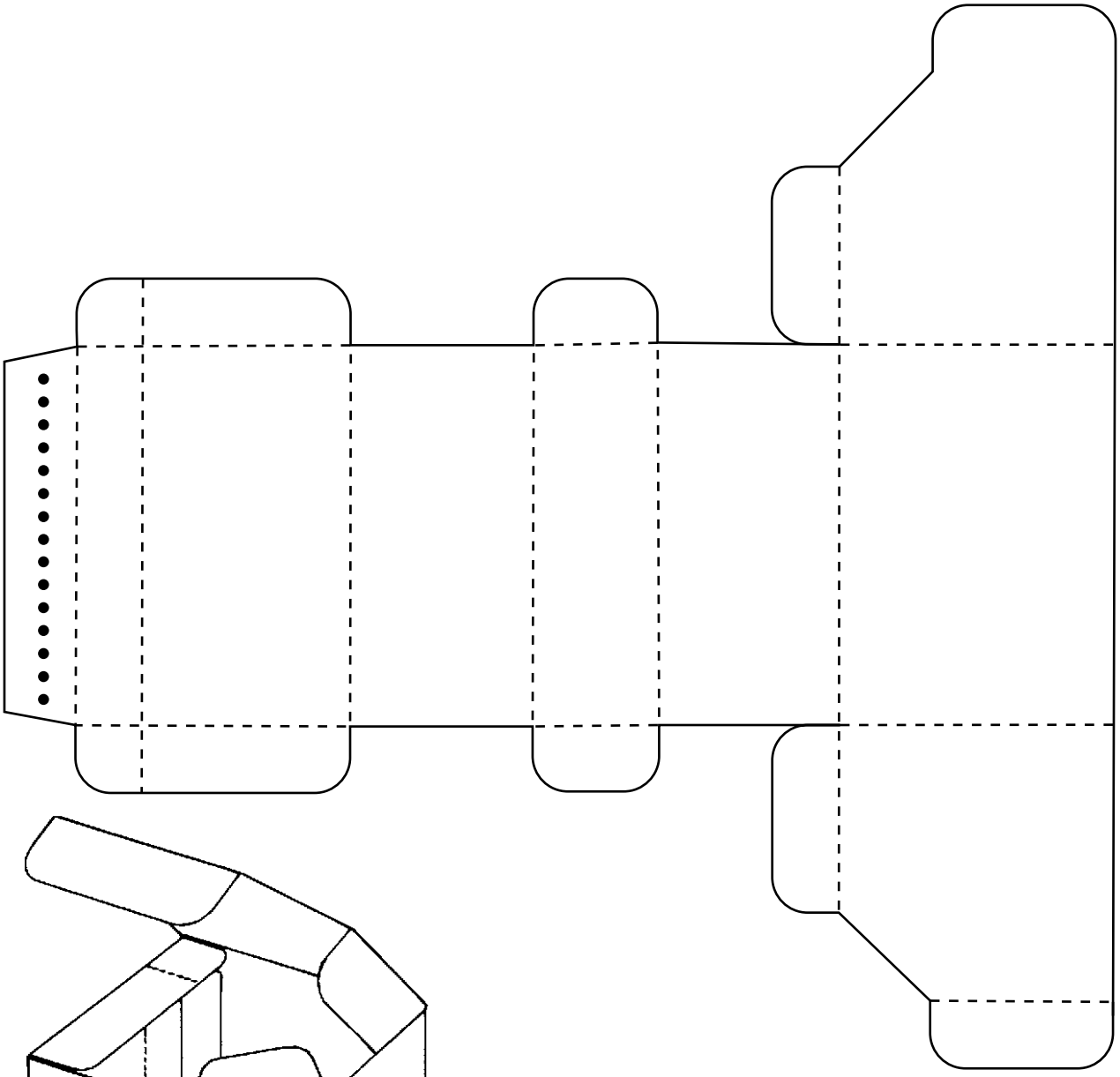
An alternate version of a six-sided package.

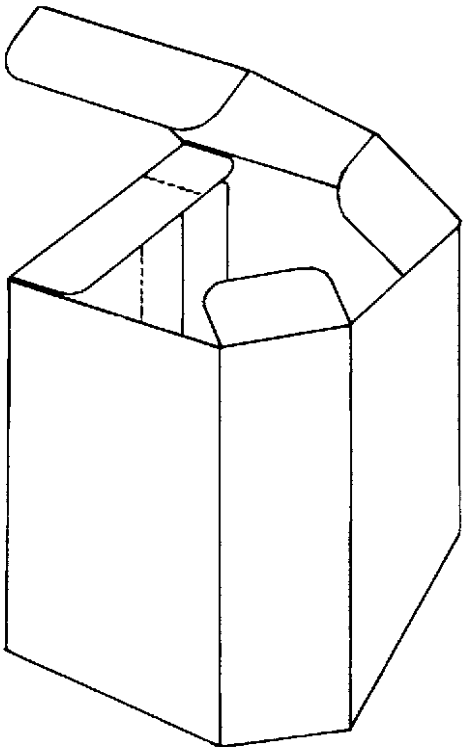
SIX-FACETED CANDY BOX



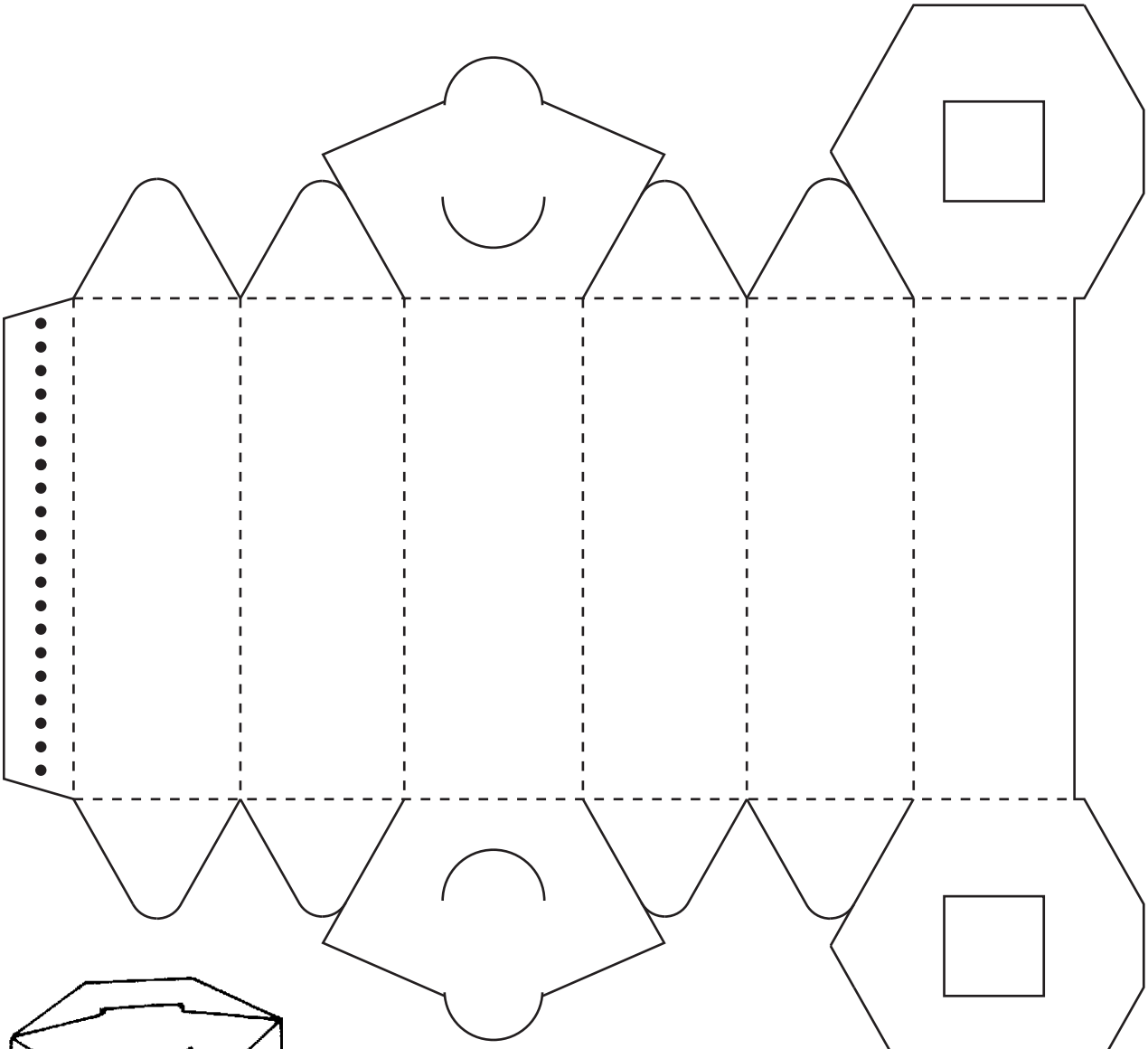


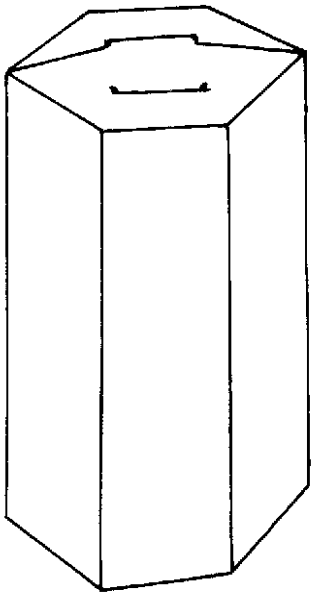
FIVE-SIDED TUCK

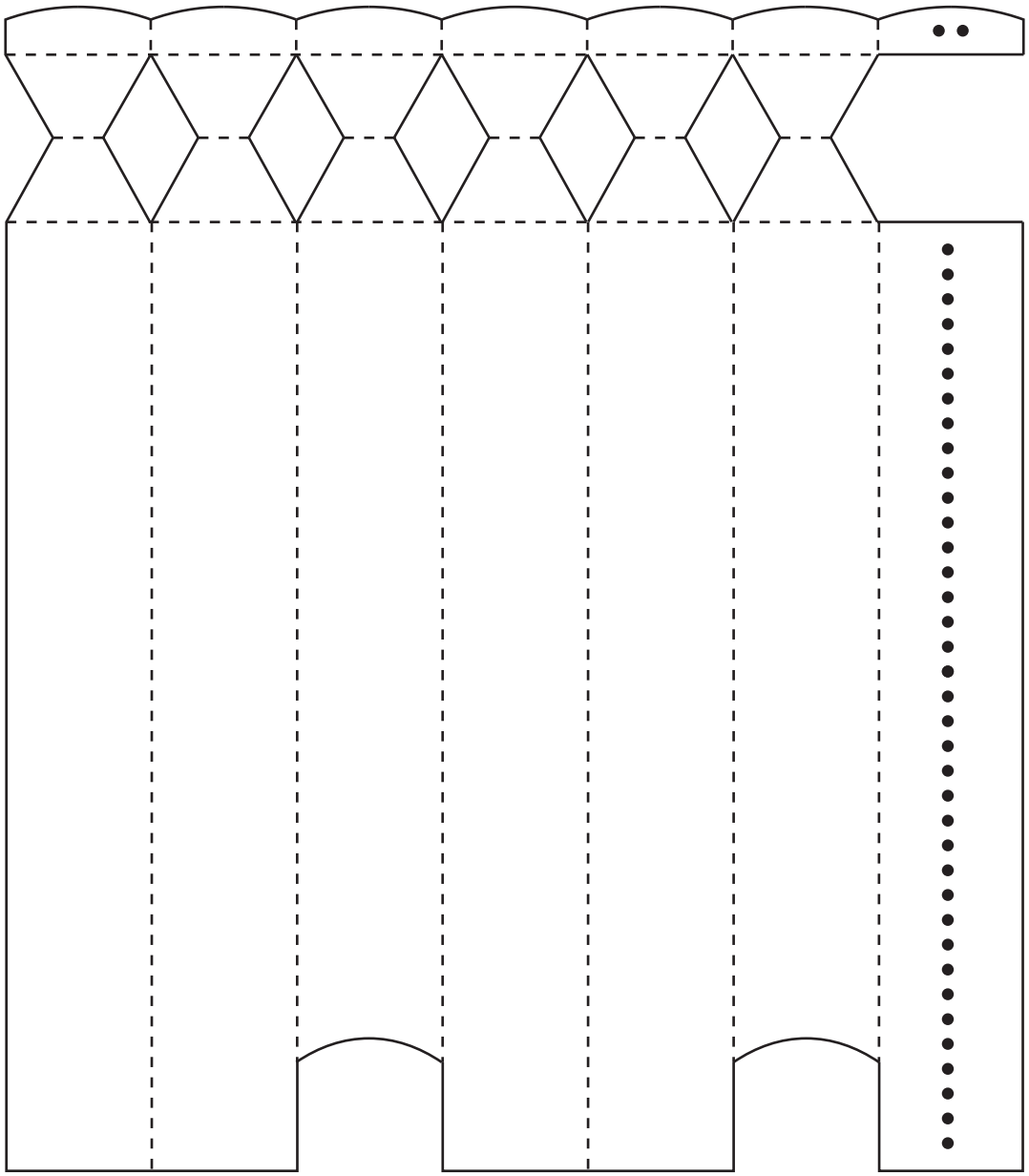


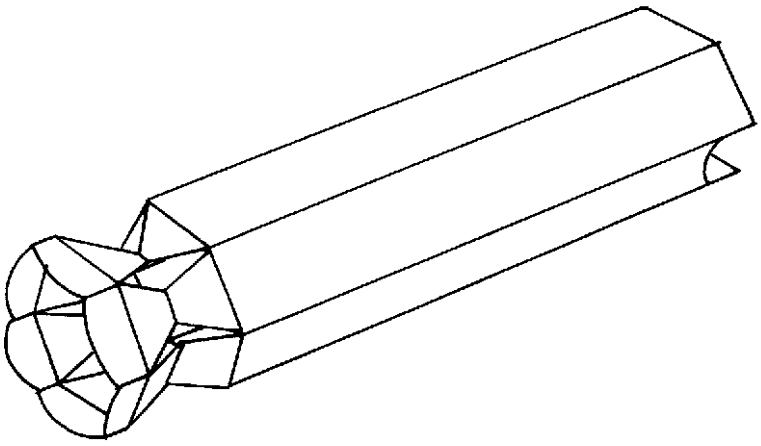


HEXAGON WITH GREENLEAF TOP AND BOTTOM

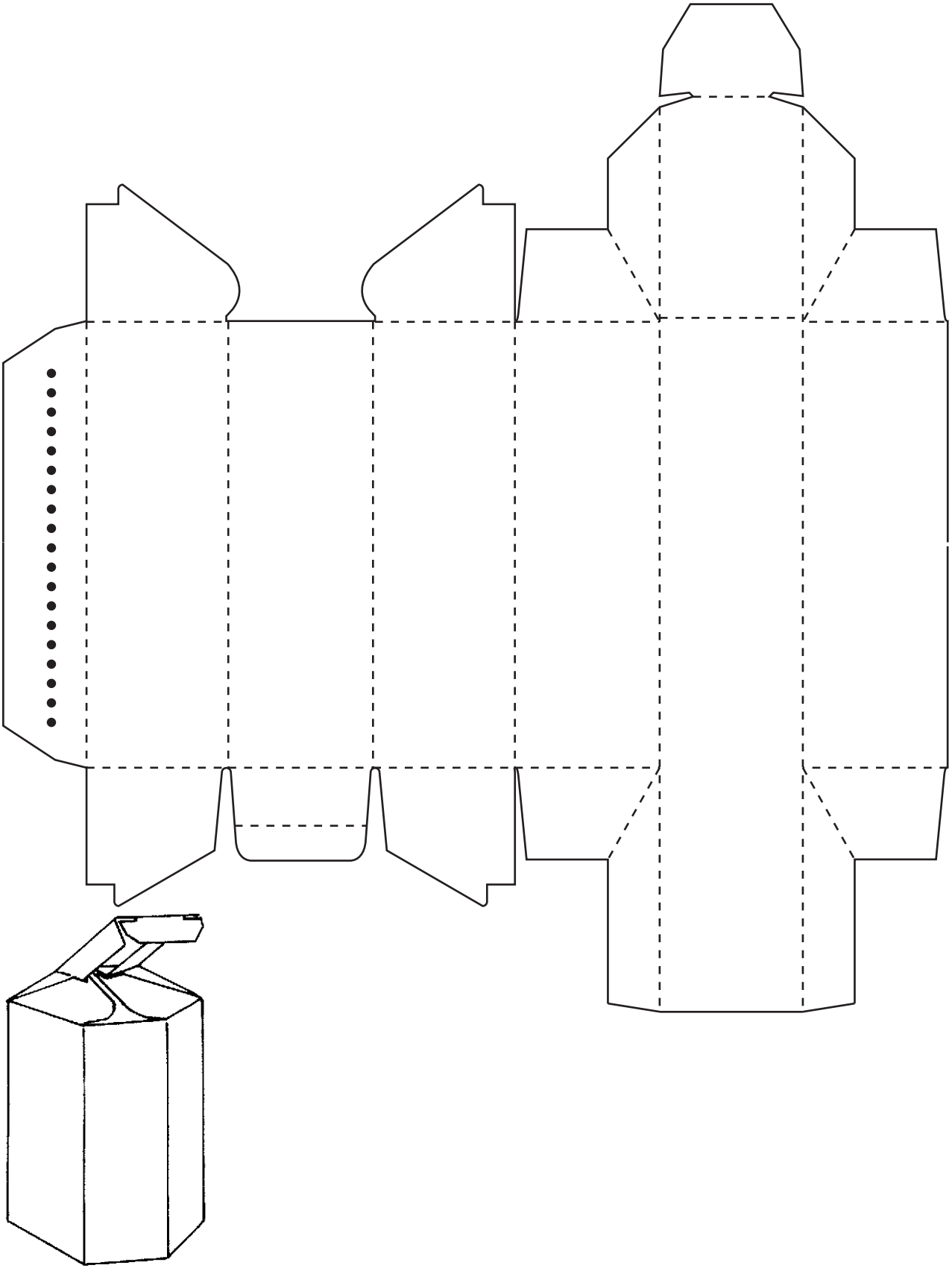


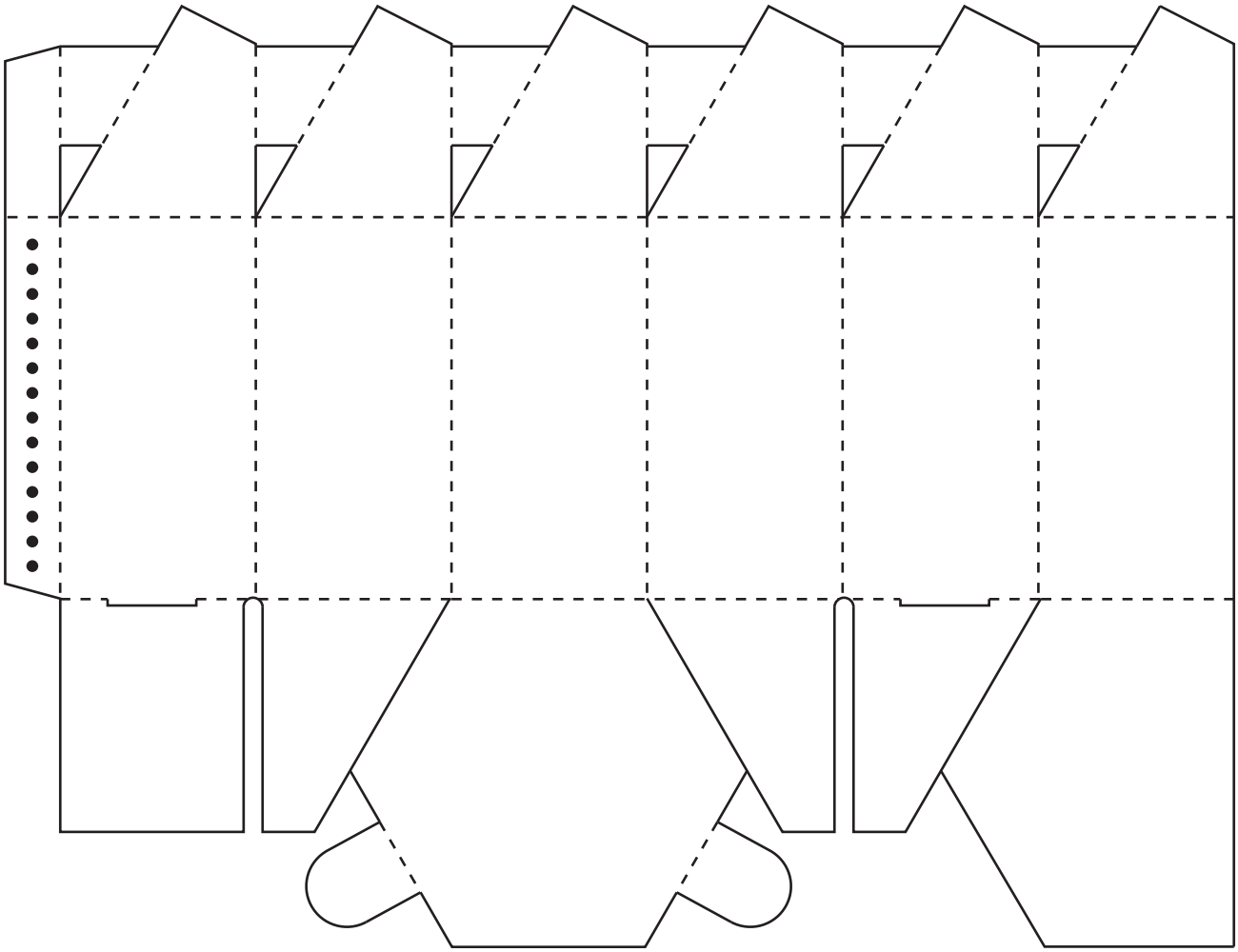


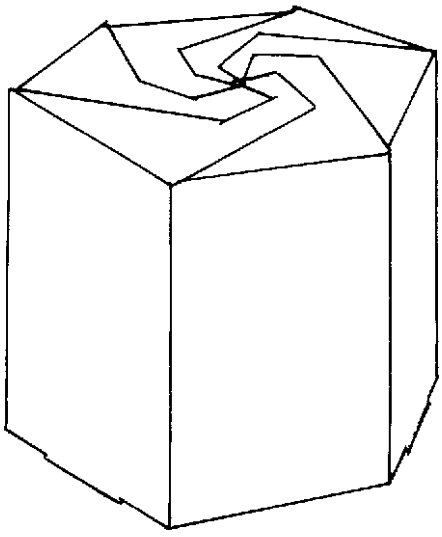




HEXAGON WITH REVERSE TUCKS AND BELLOW SIDE FLAPS

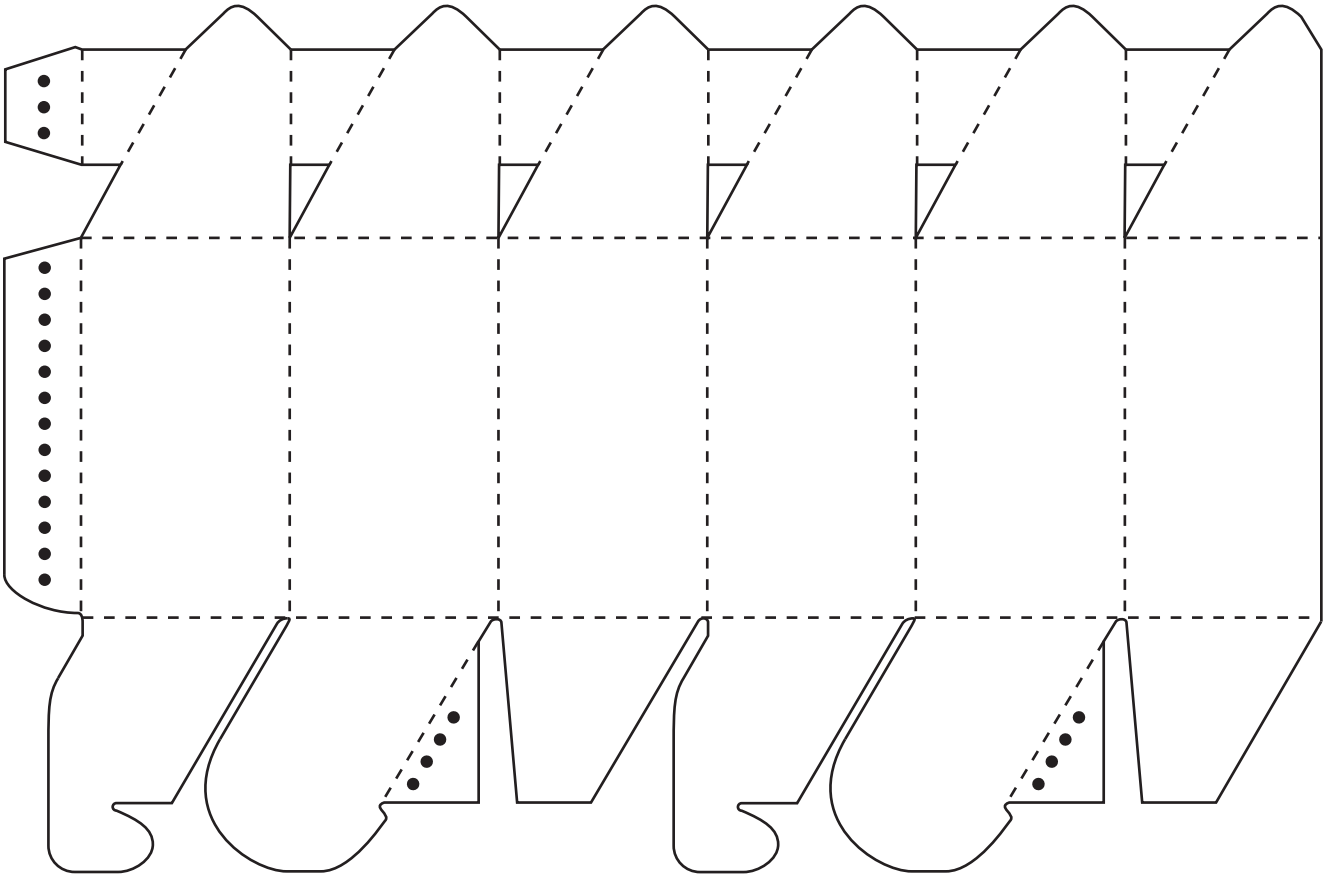


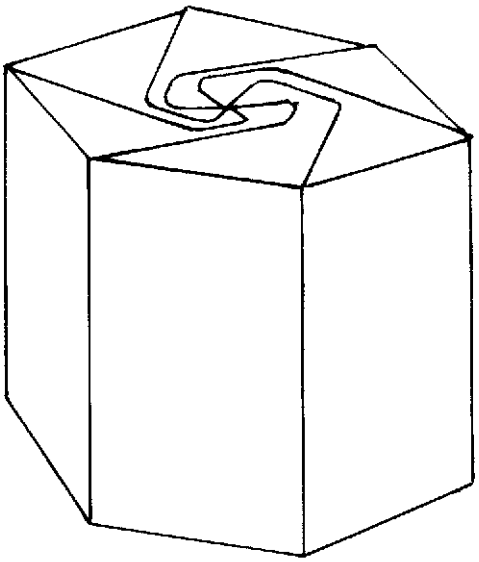


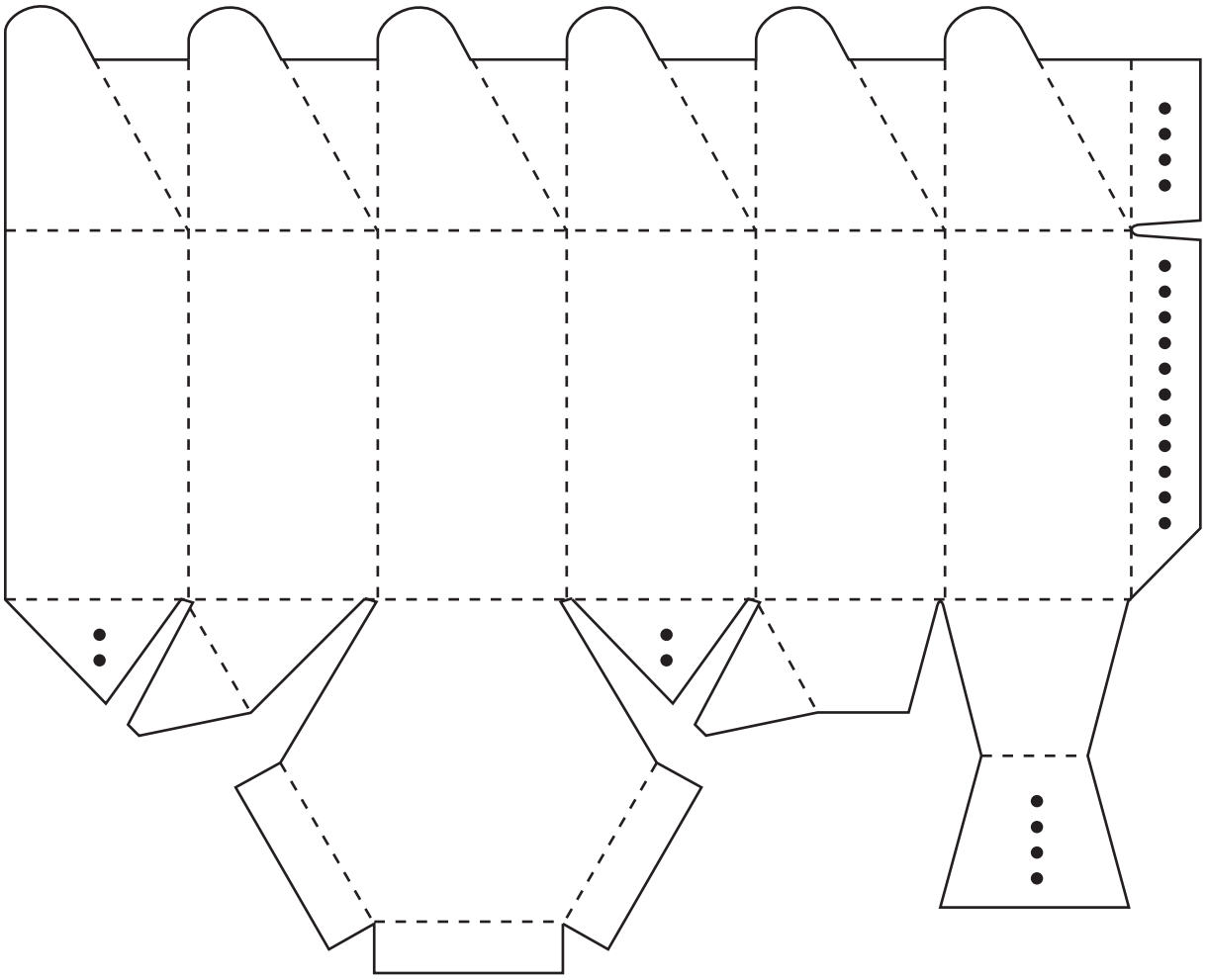


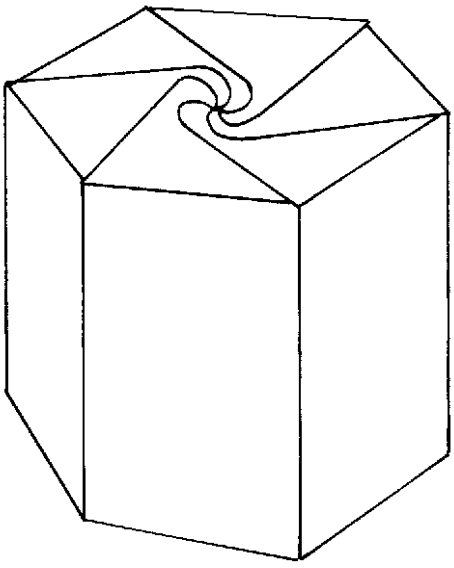
The small triangles have been die-cut out of the top closure to permit easier closing.

SIX-SIDED CARTON WITH PUSH-IN CLOSURE AND AUTOMATIC GLUED BOTTOM



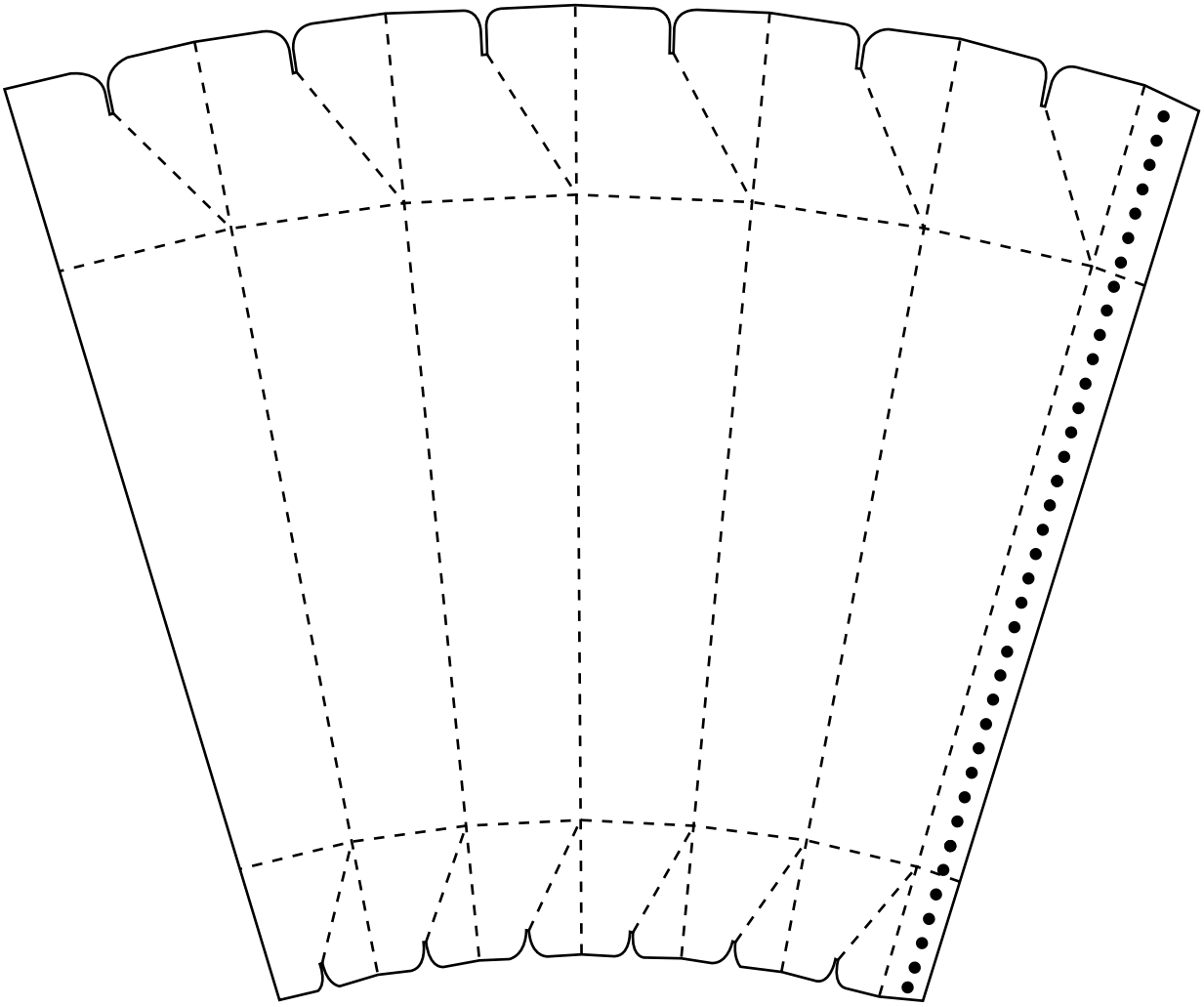


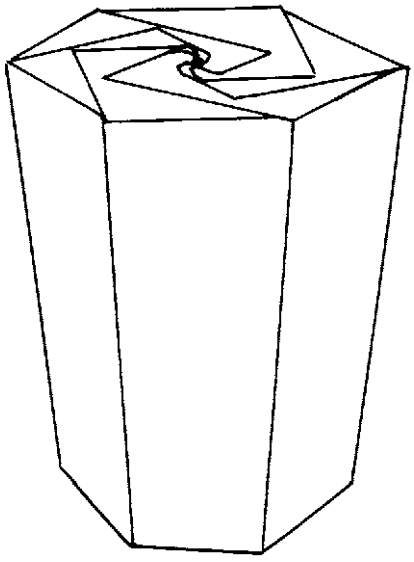


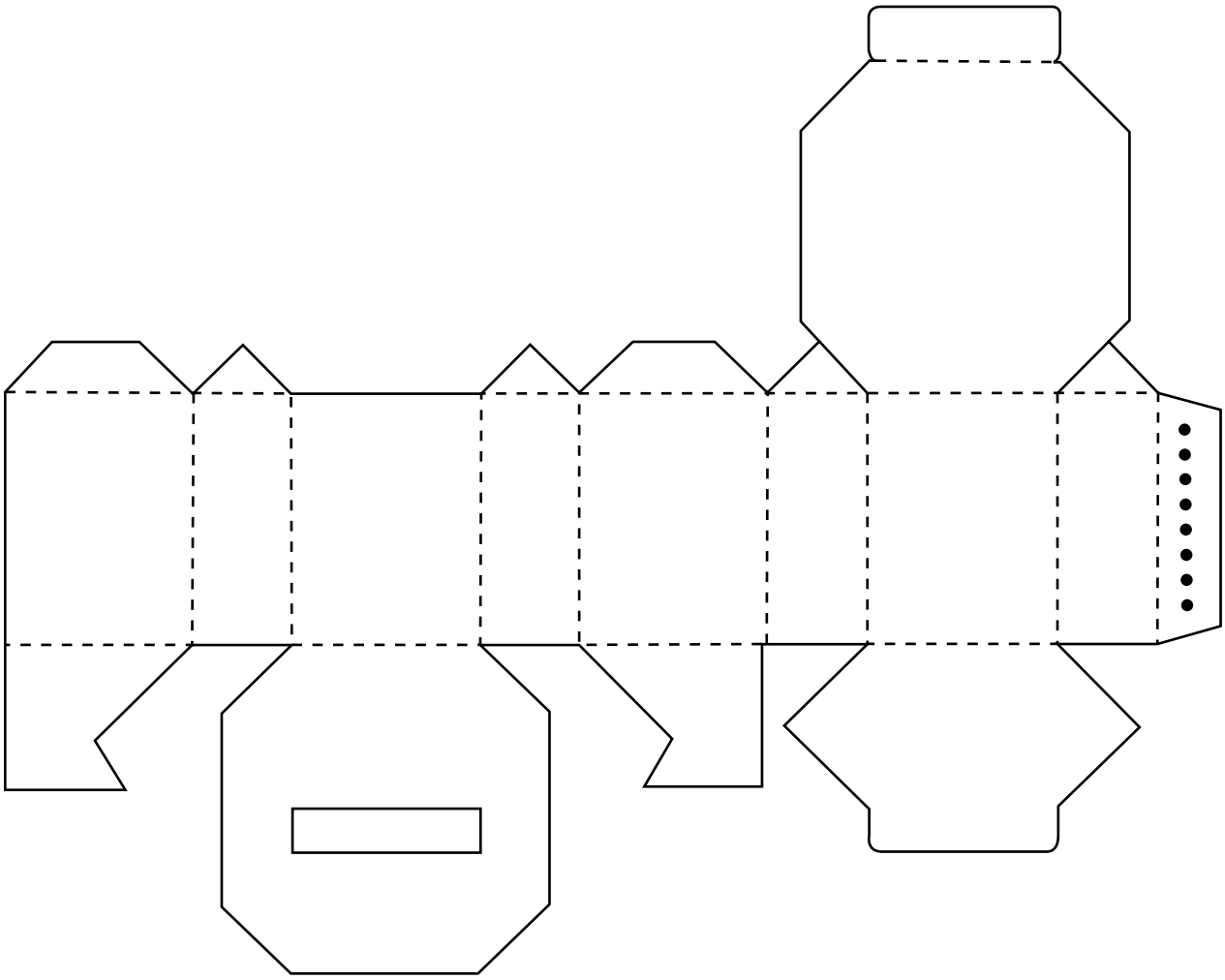


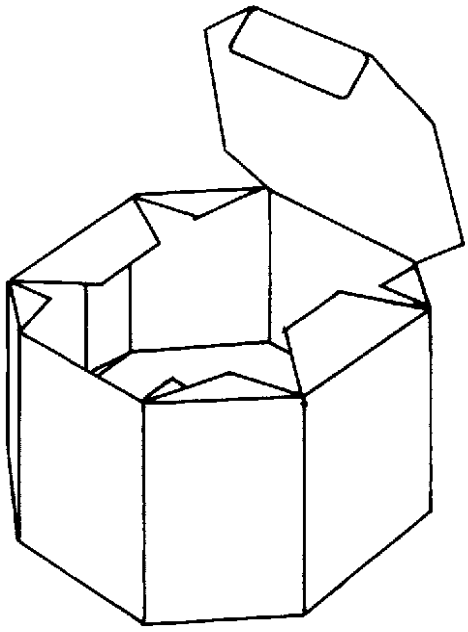
A variation of the previous two patterns, this carton also has an auto-glued bottom.

HEXAGONAL TAPERED BOX WITH PUSH-IN TOP AND BOTTOM



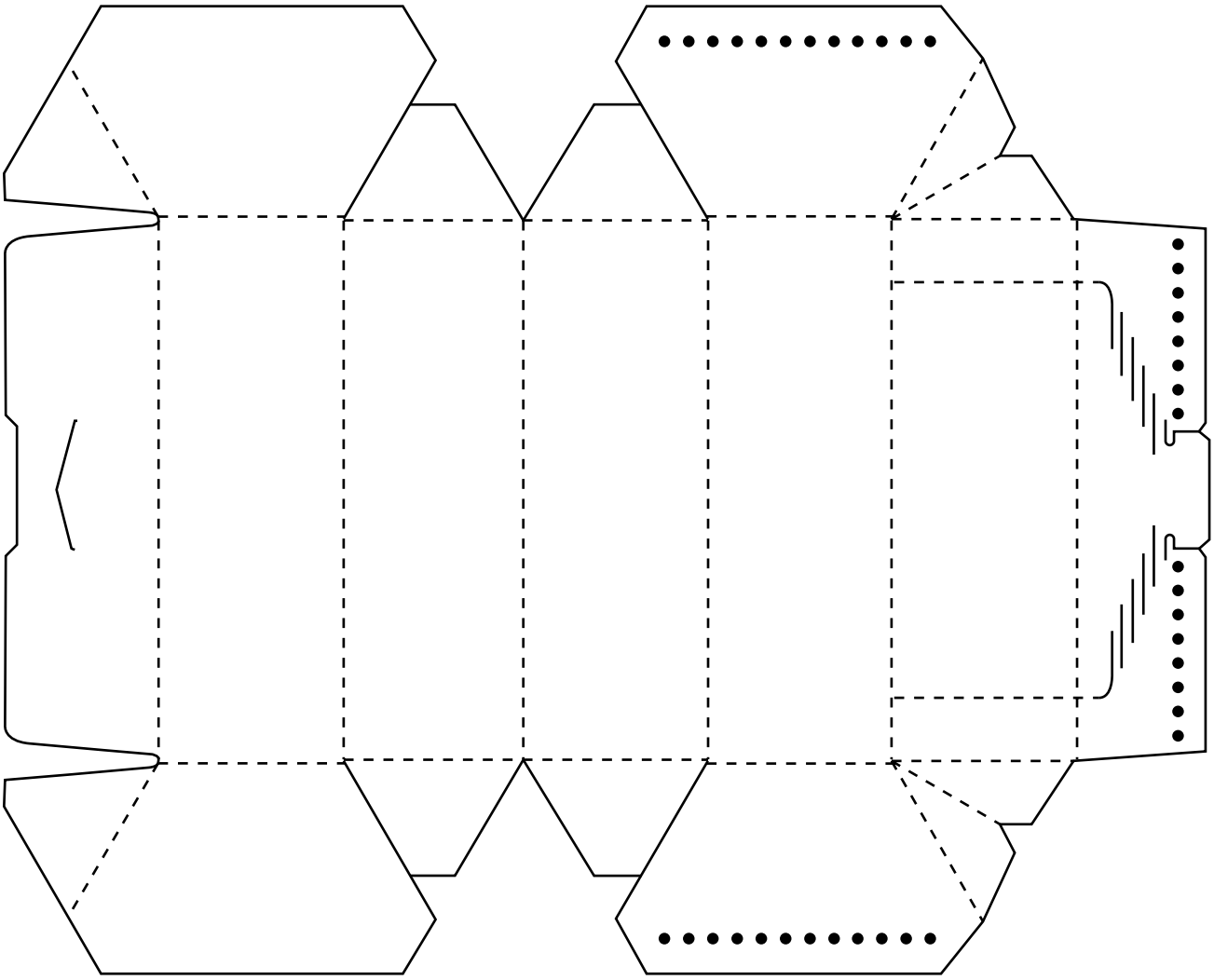


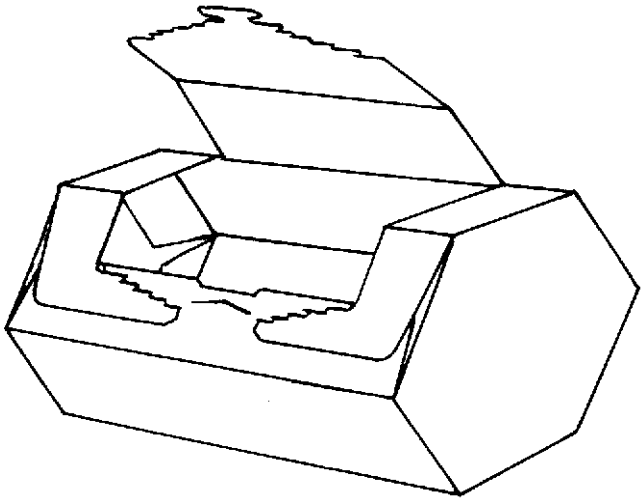


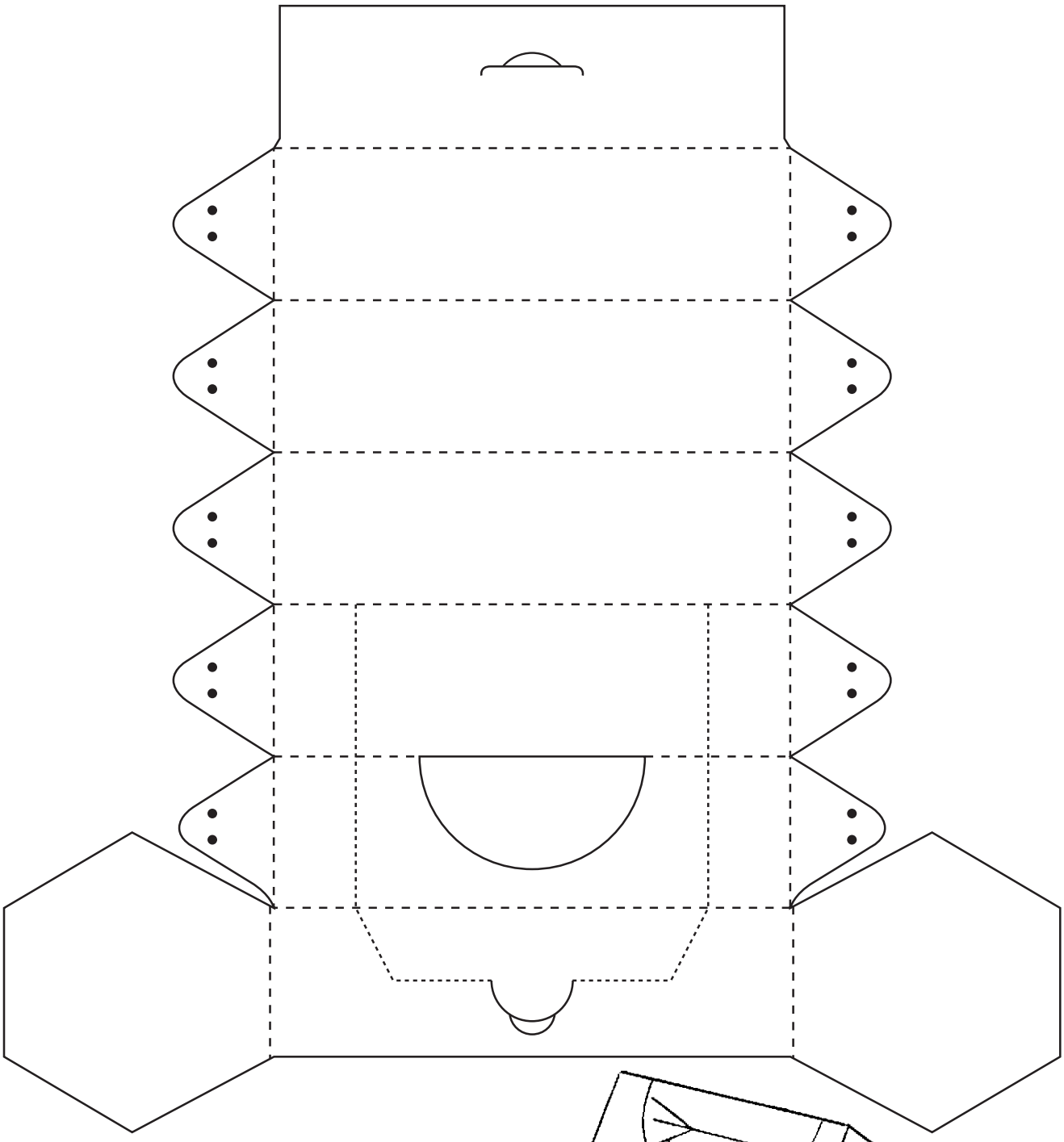


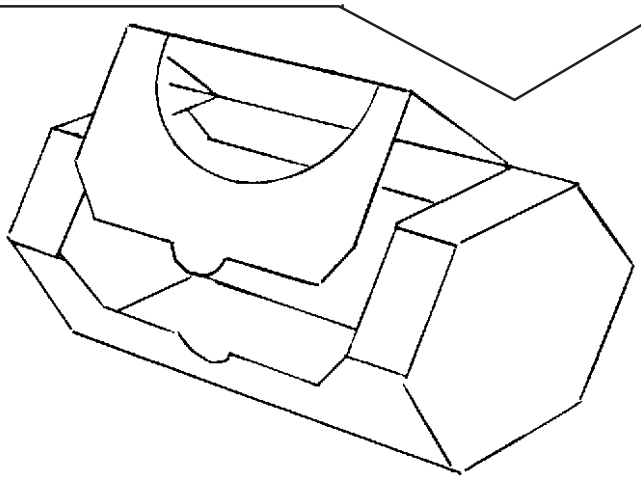
A variation of the 1-2-3 bottom.

SIX-SIDED DISPENSER PACKAGE WITH TEAR-AWAY OPENING
(Pat. Kliklok)

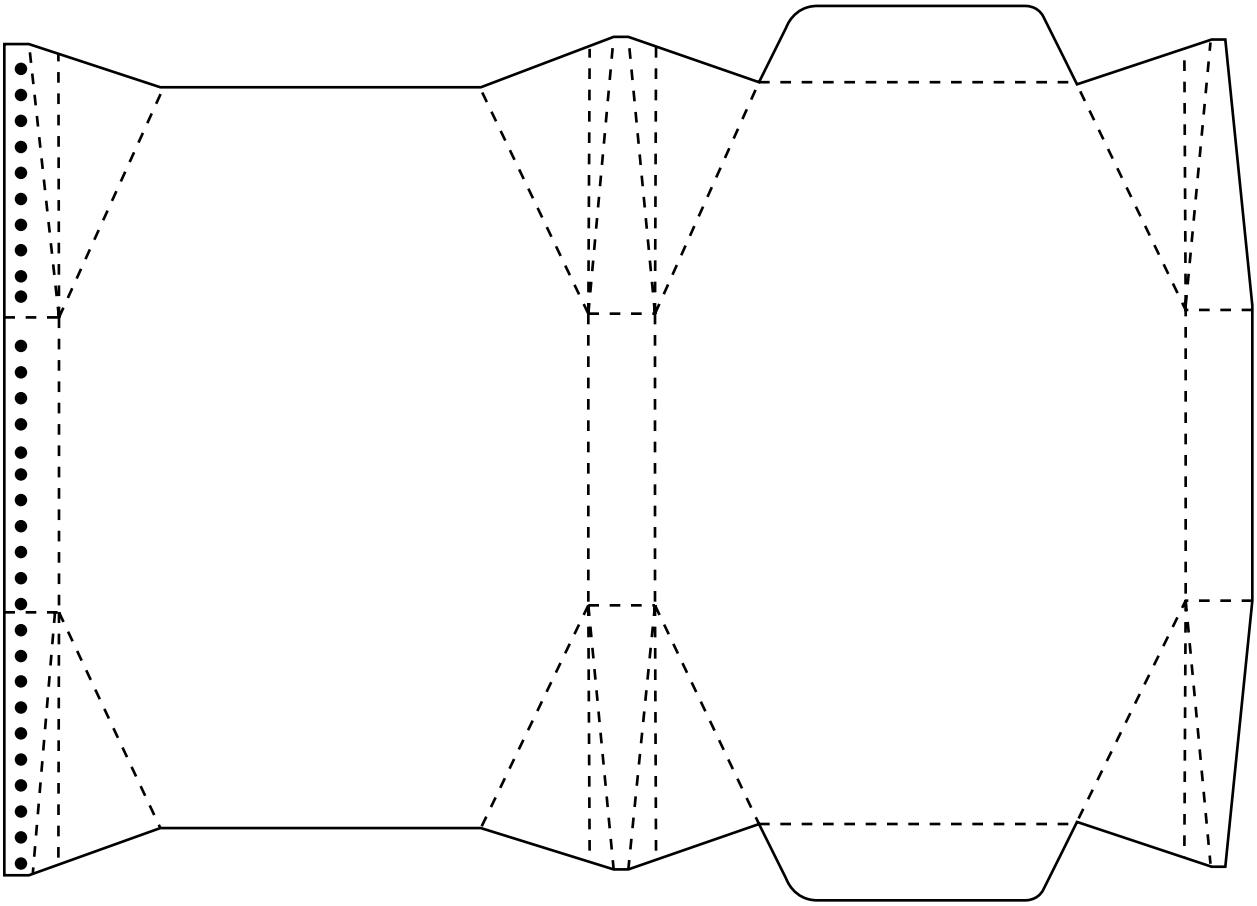




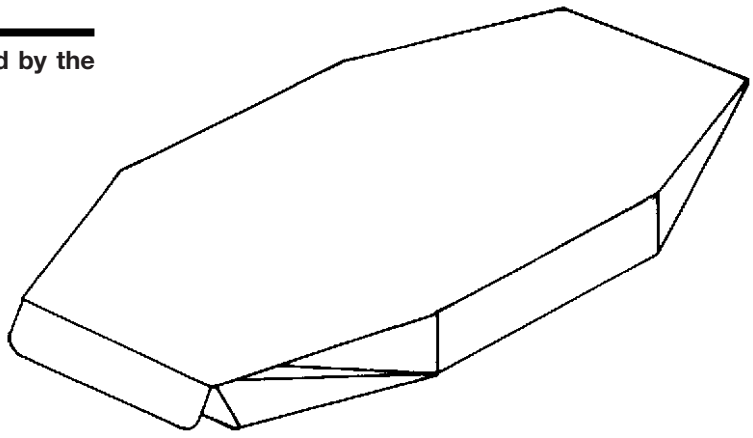


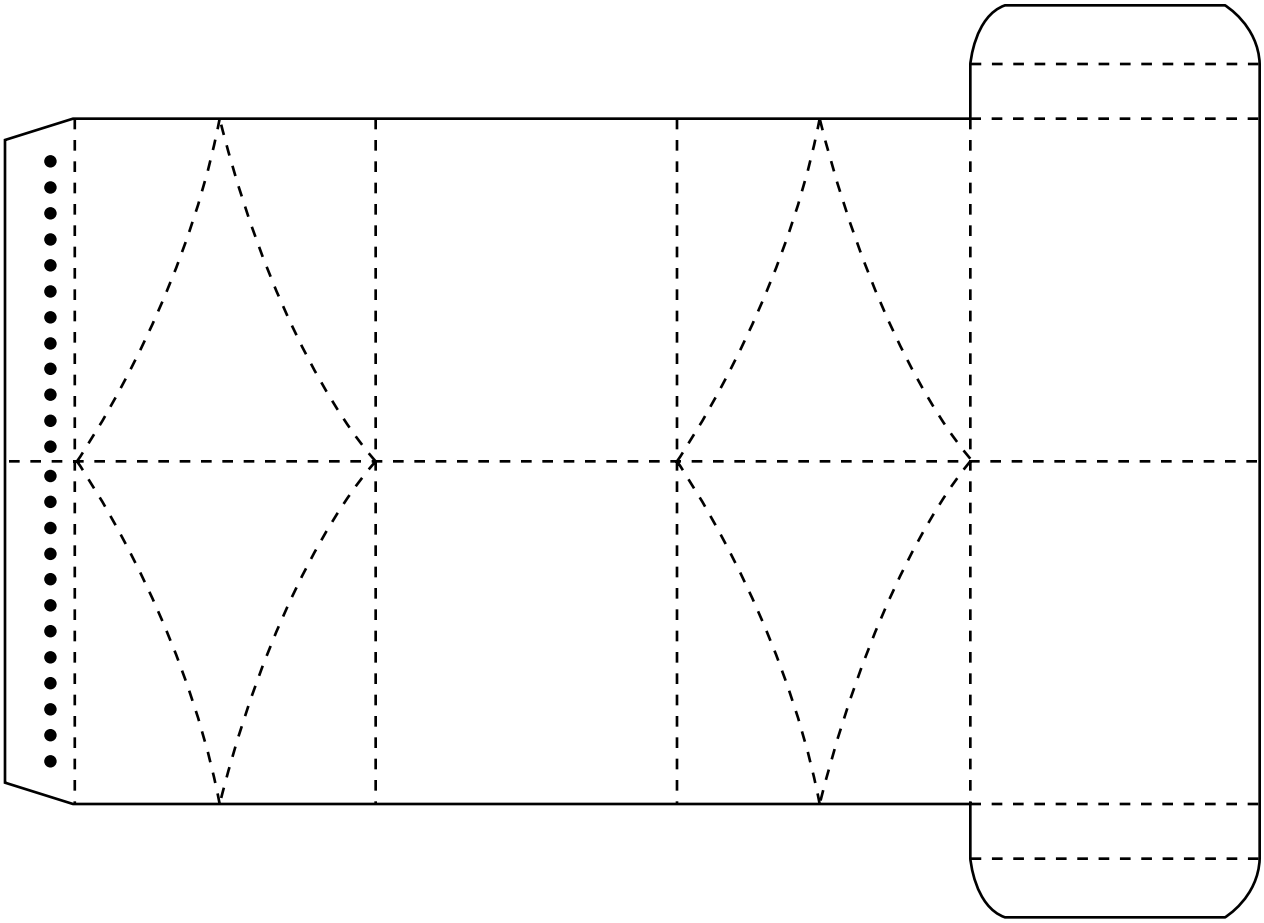


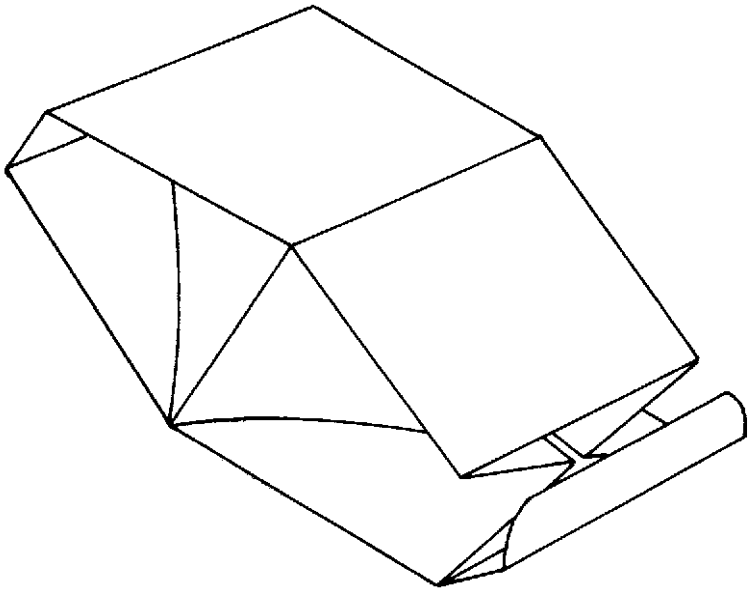
This candy package features a reclosable perforated opening.

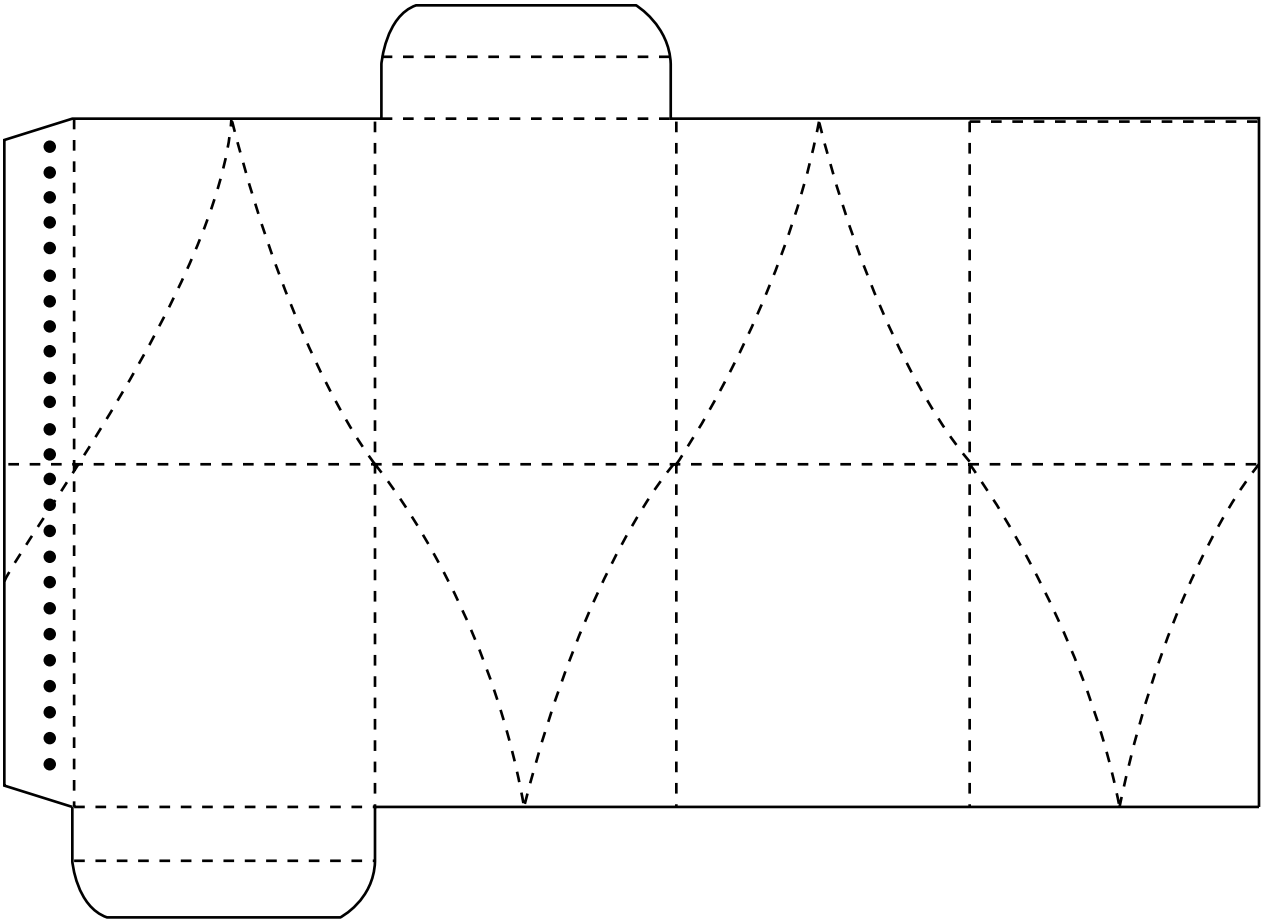


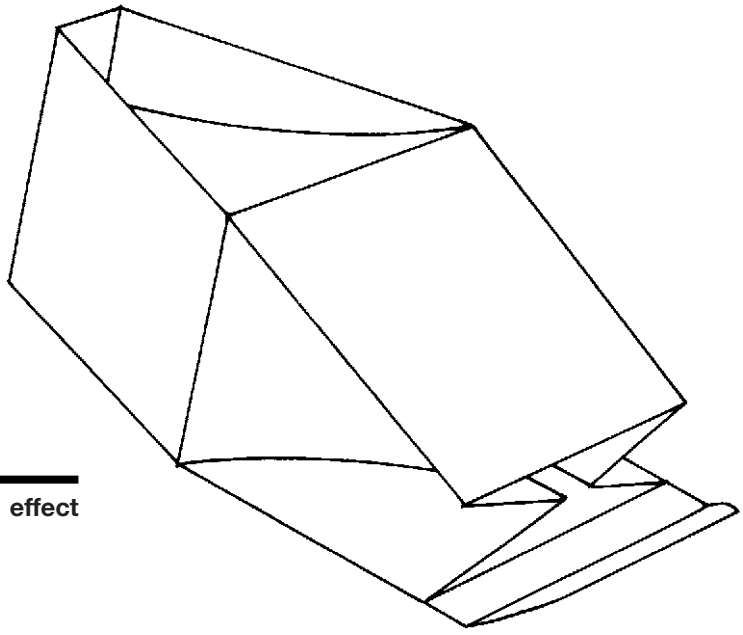
This carton has an intriguing shape created by the scoring of the riser panels.



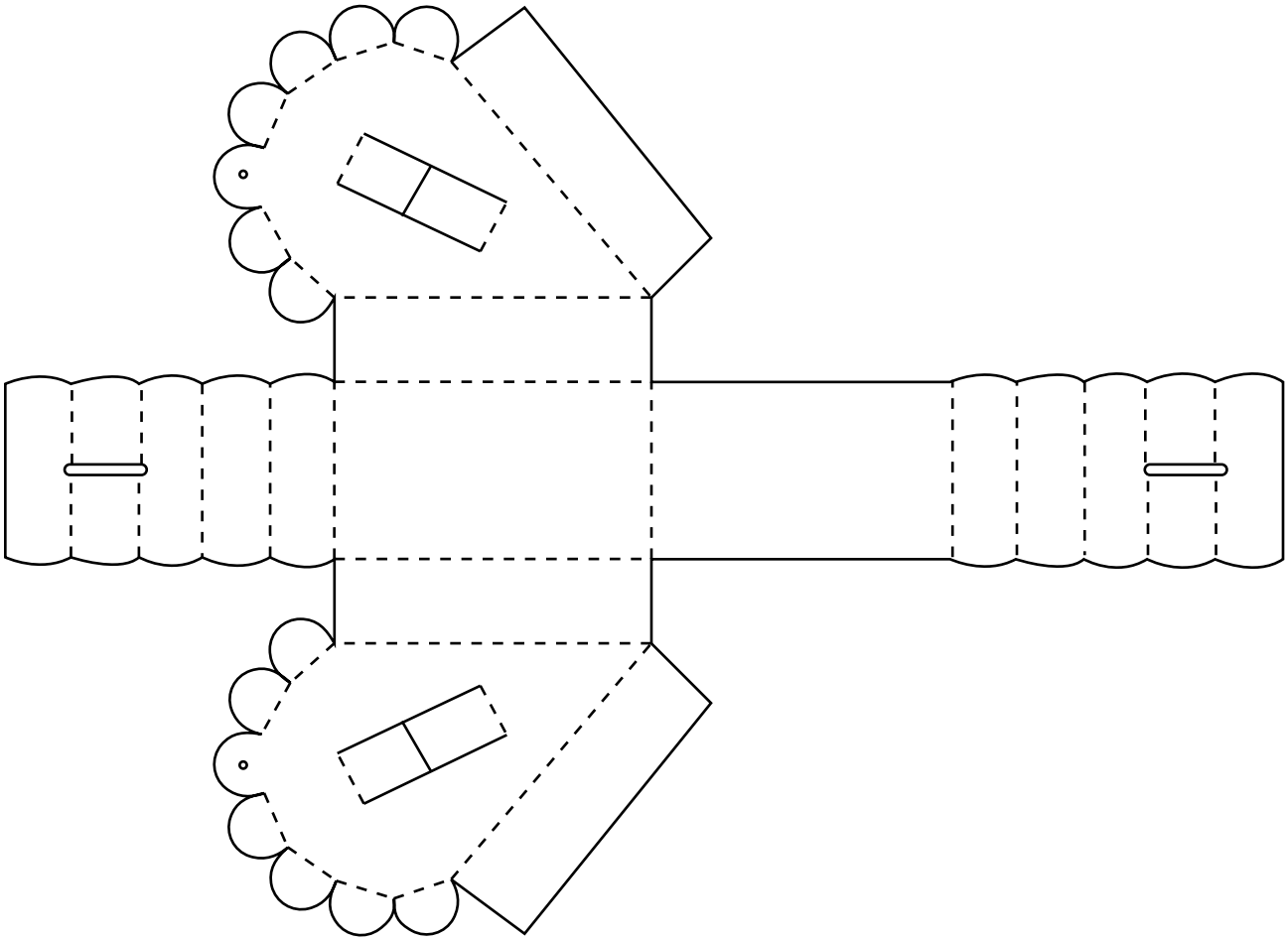




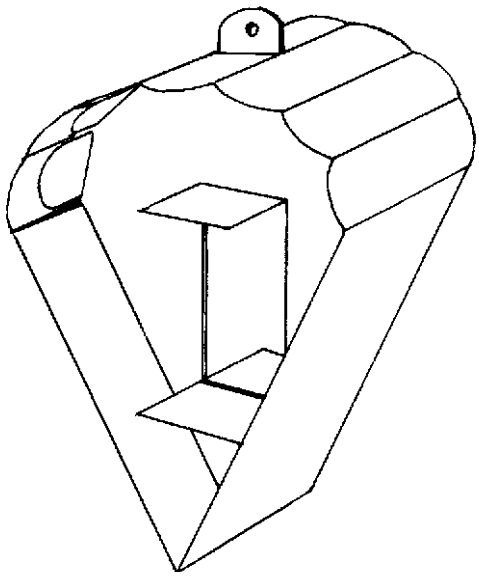




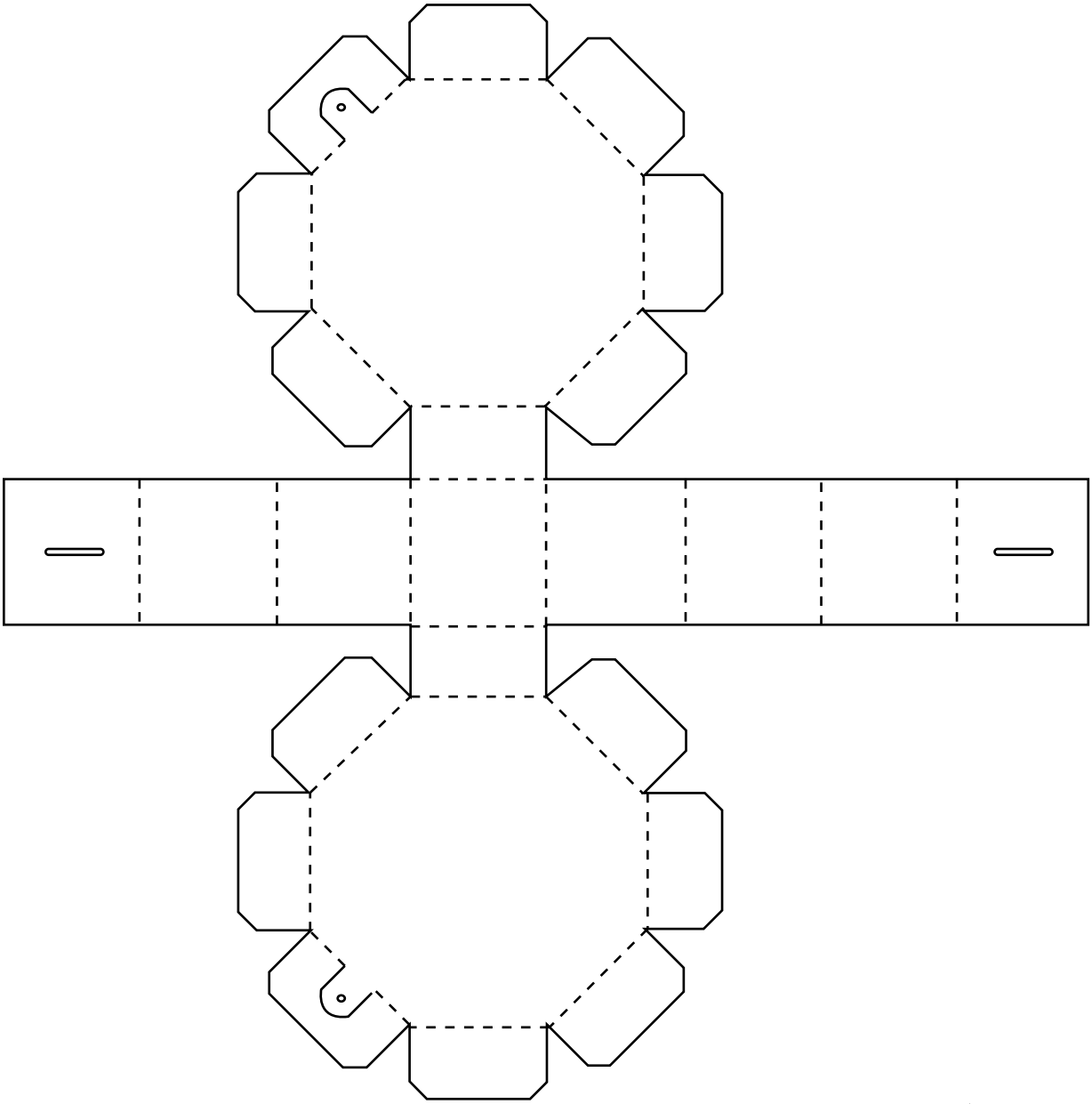
By alternating the scores, a totally different effect may be obtained.

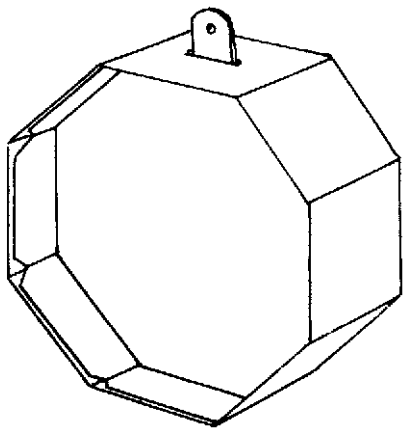


This and the following patterns may be executed in many different stocks. With die-cut shapes to match their products, they make ideal holiday gifts/ ornaments.

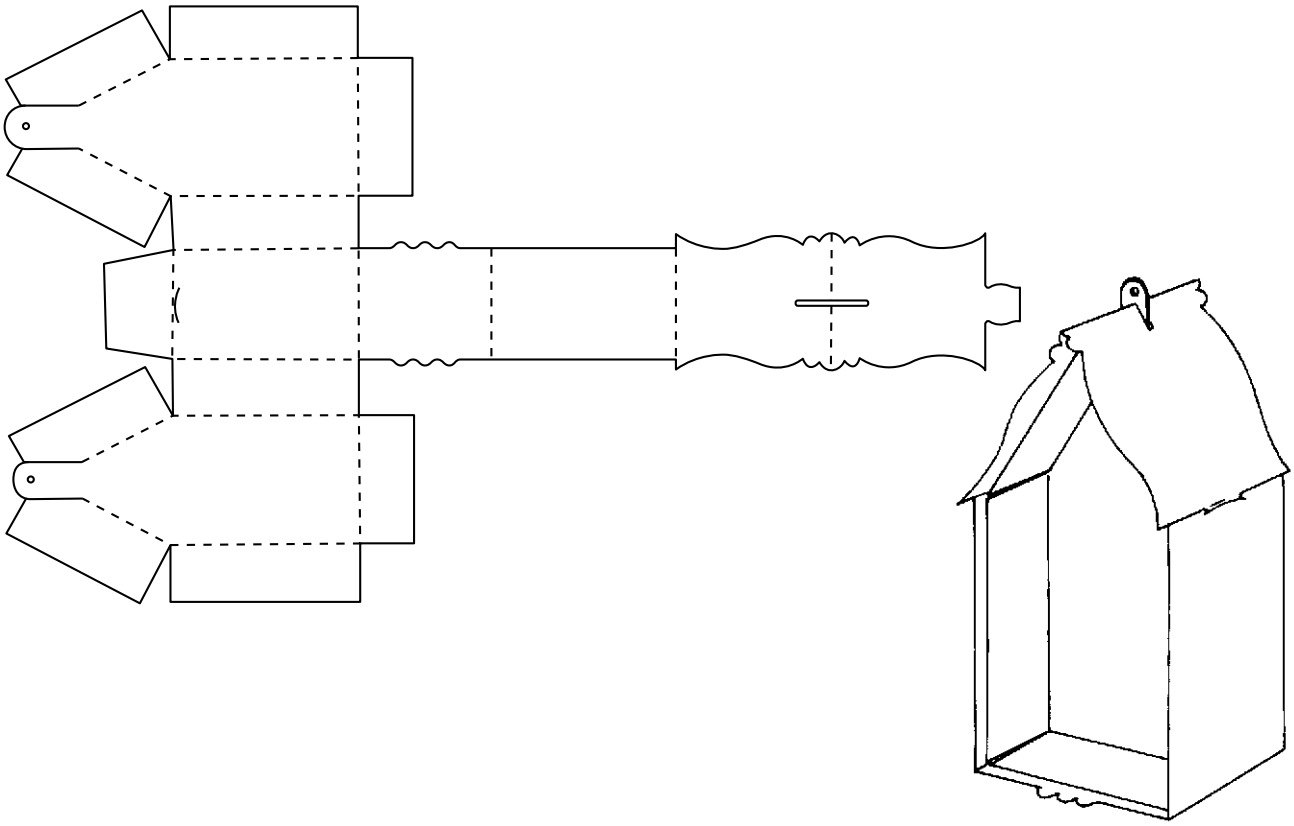


OCTAGONAL OPEN CONTAINER

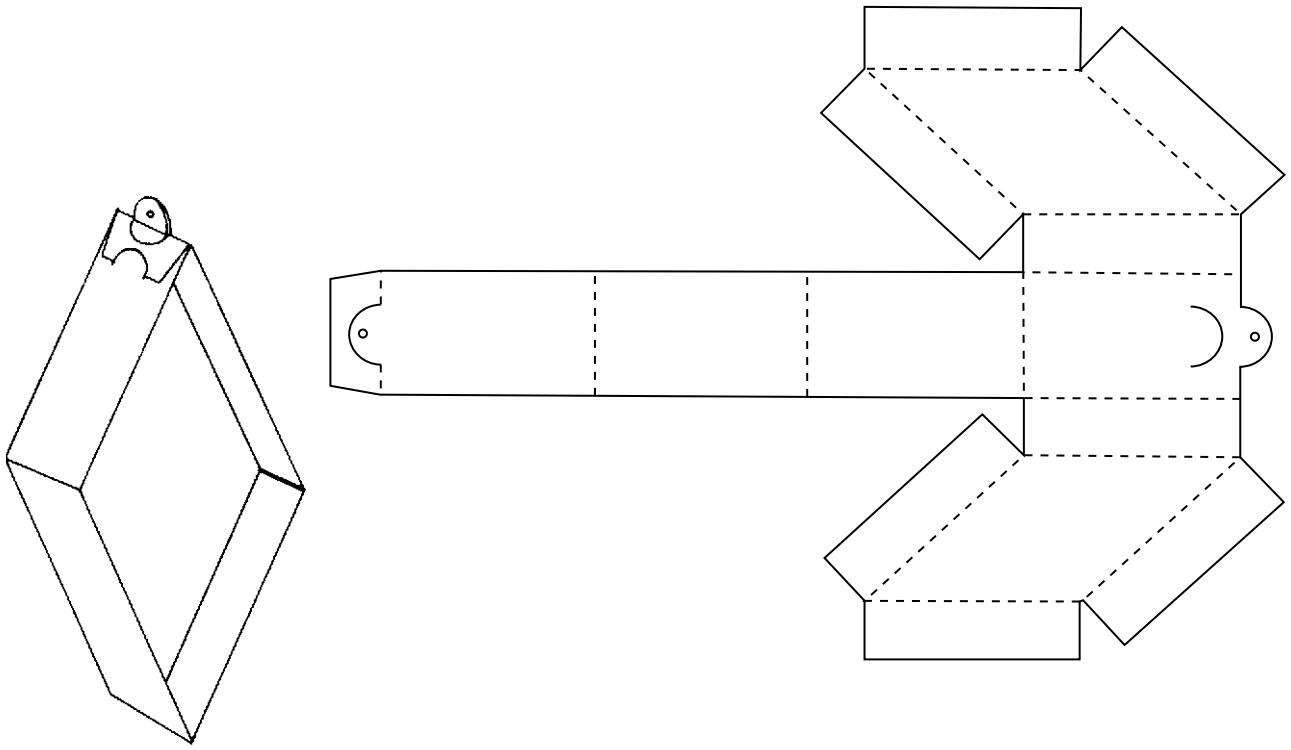


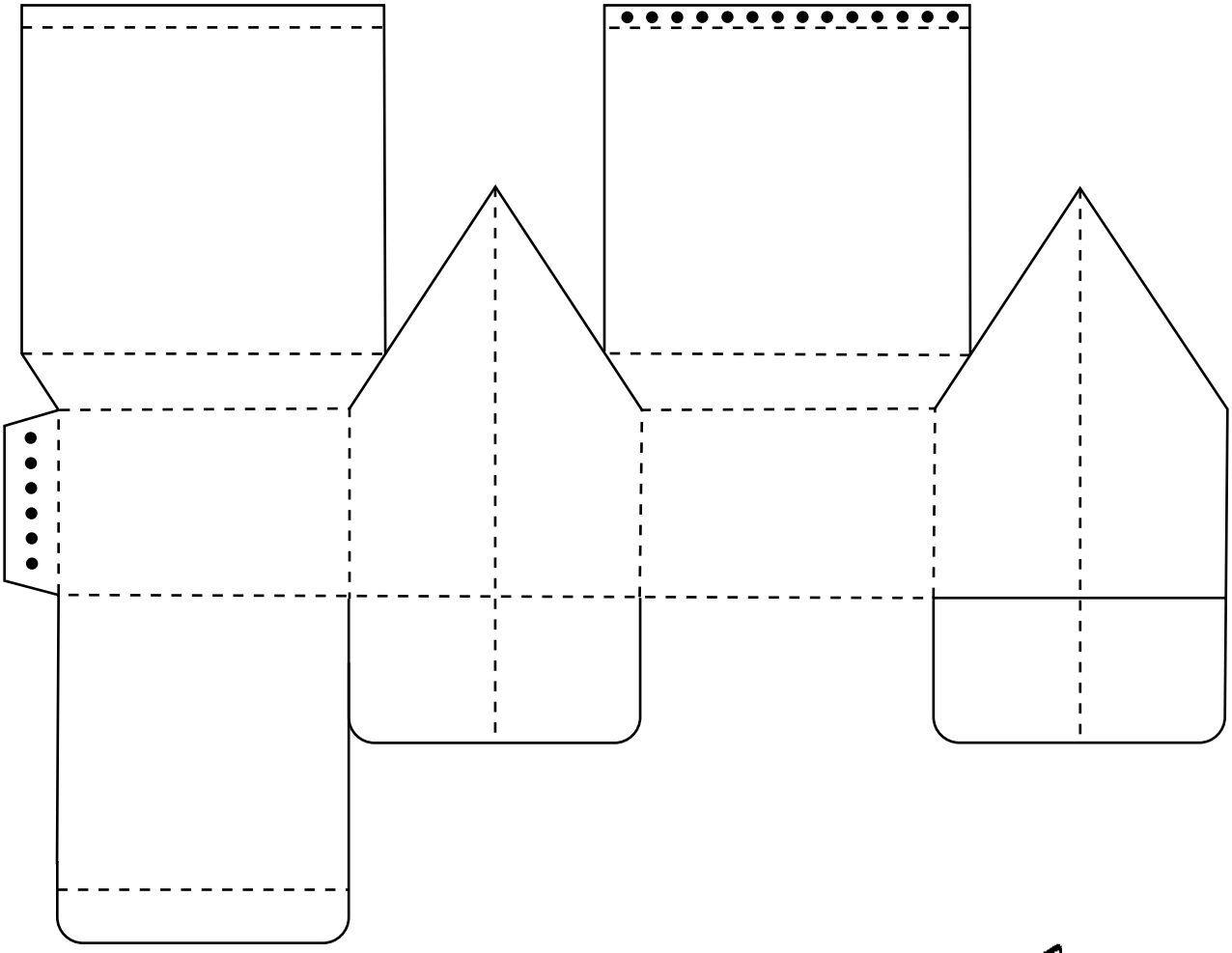


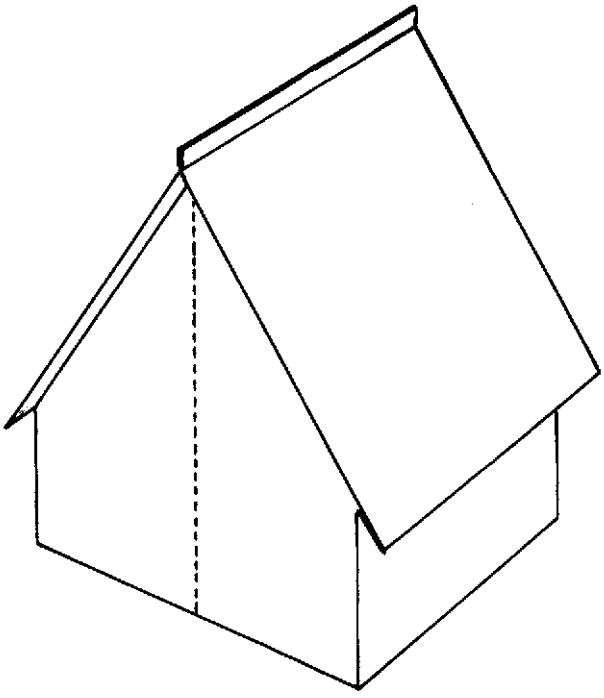
BIRDHOUSE SHAPED OPEN CONTAINER



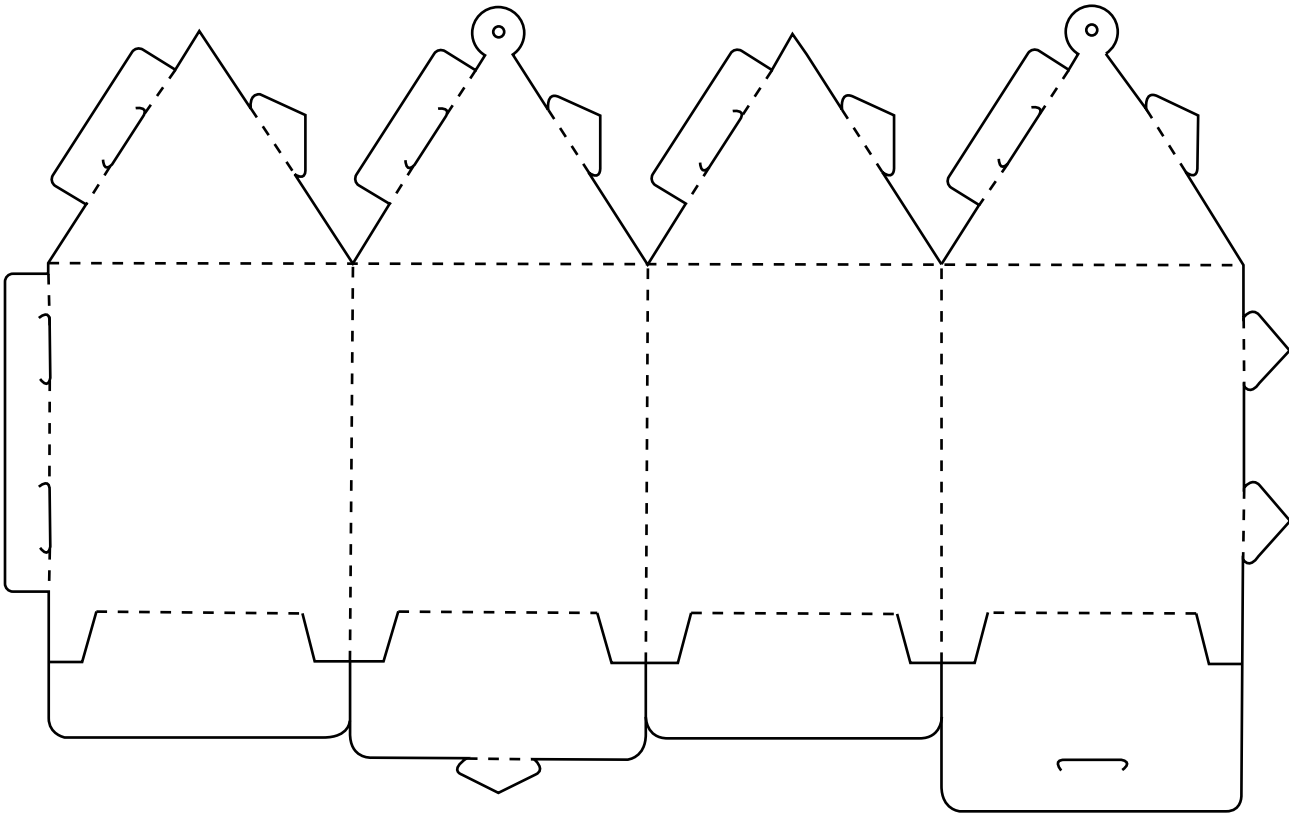
DIAMOND-SHAPED OPEN CONTAINER

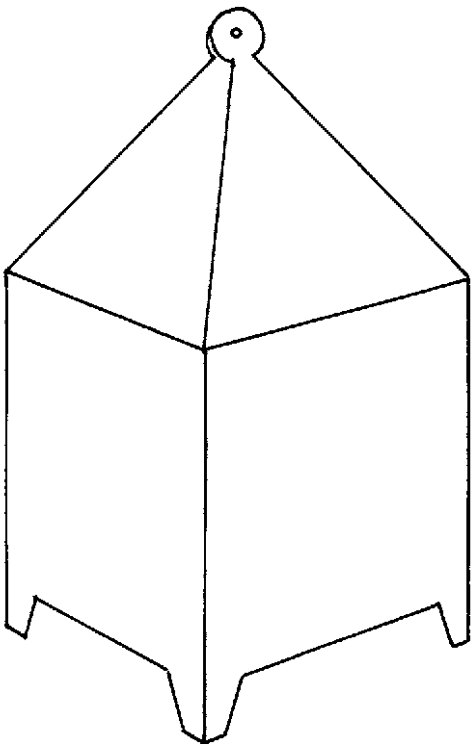






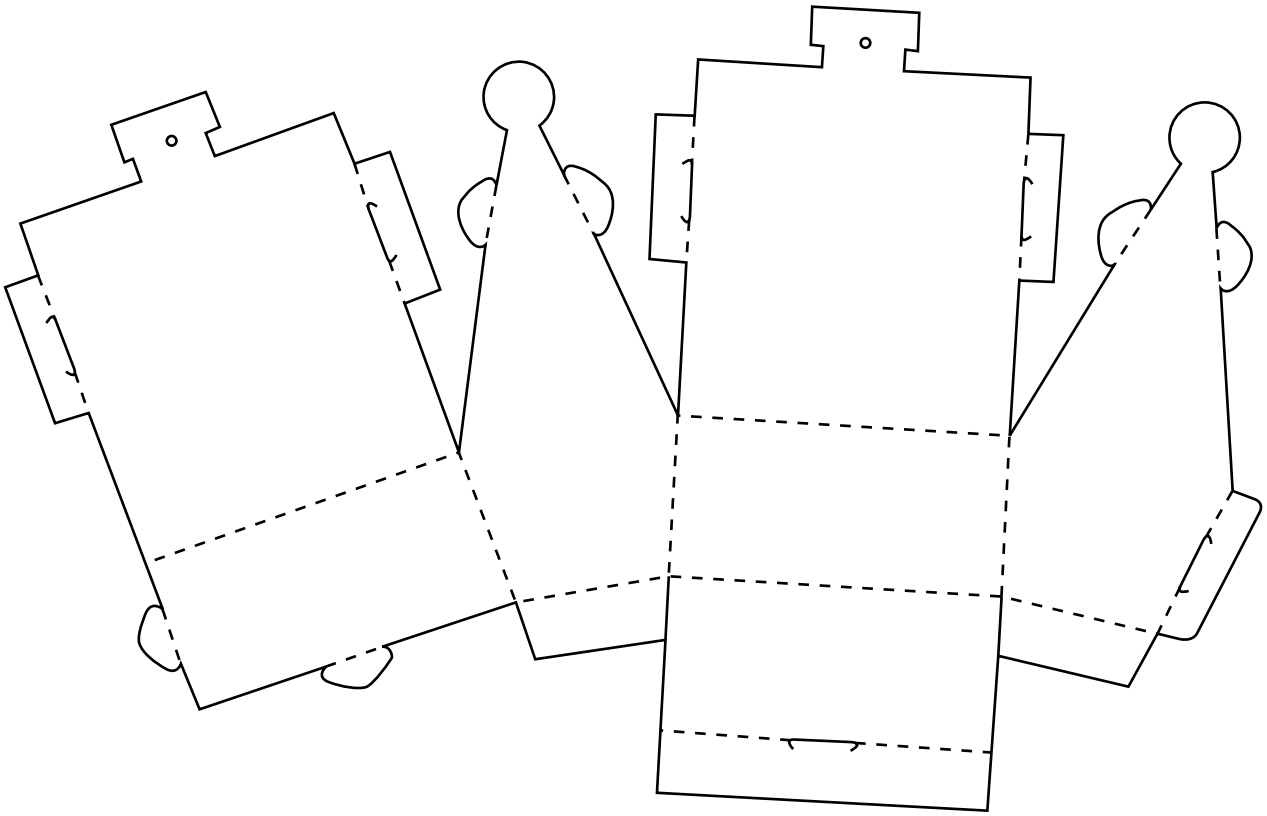
This house-shaped package only needs to be decorated to fit the specific needs of the product.

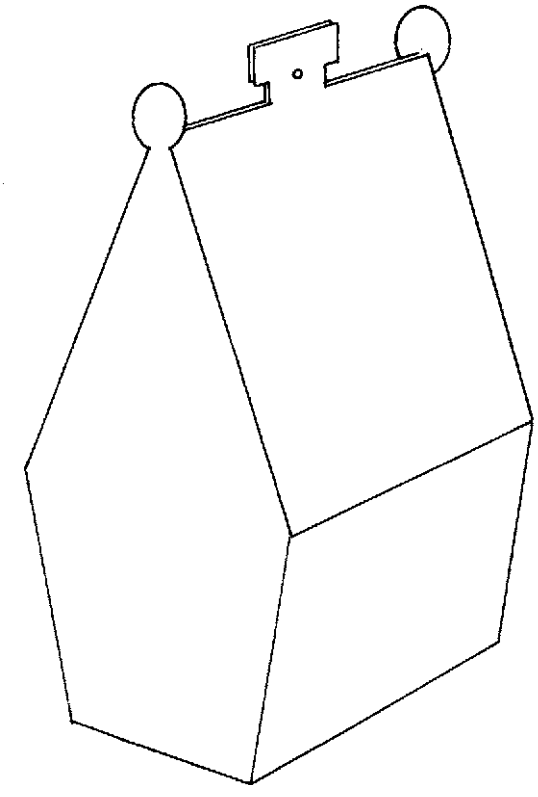




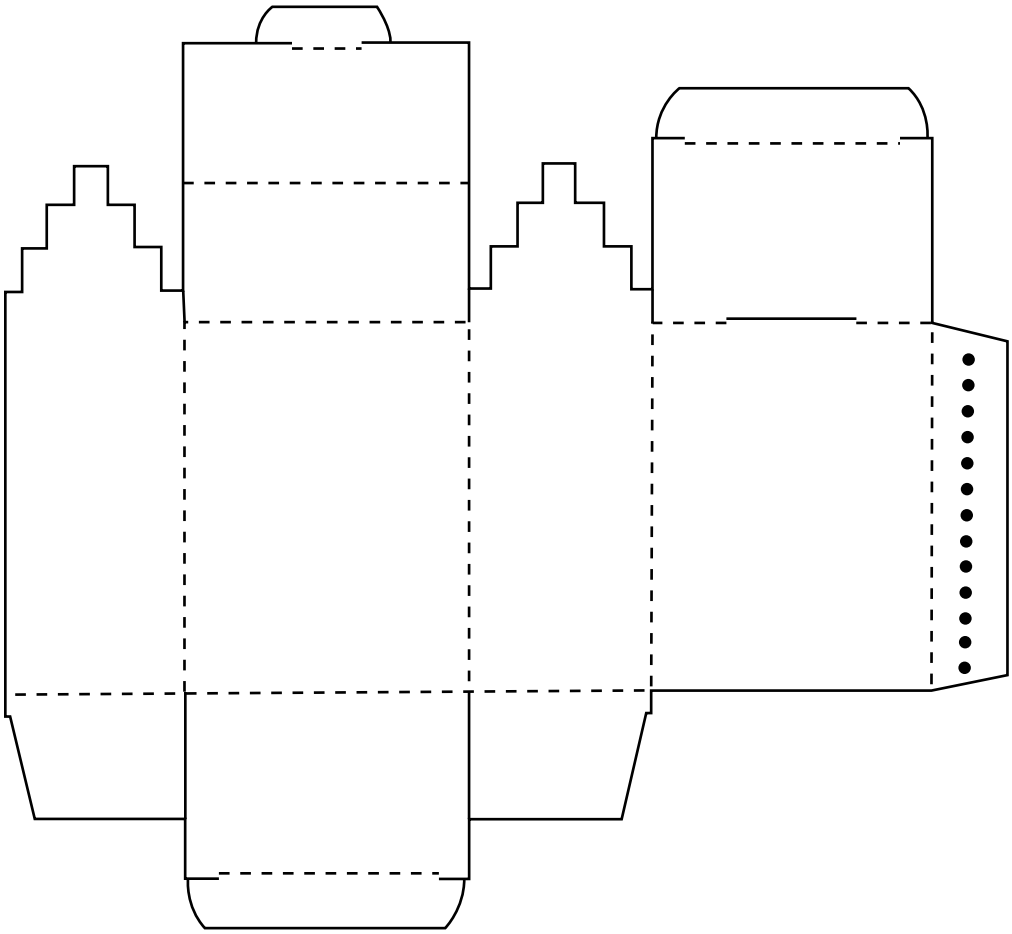
Lock tab and slit options make this package totally glue free.

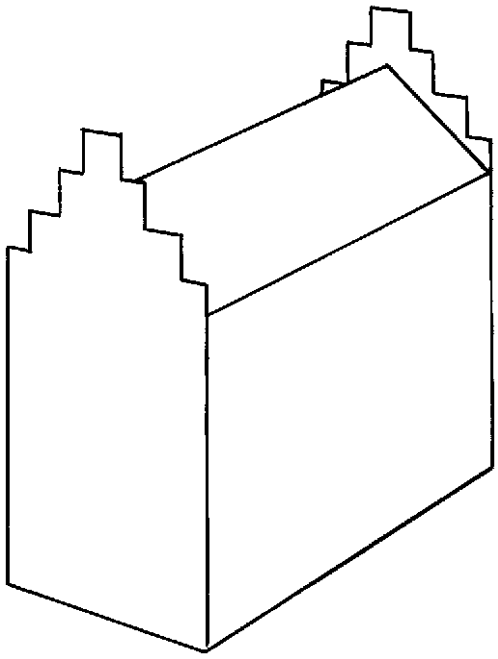
GABLE TOP WITH TAPERED SIDES



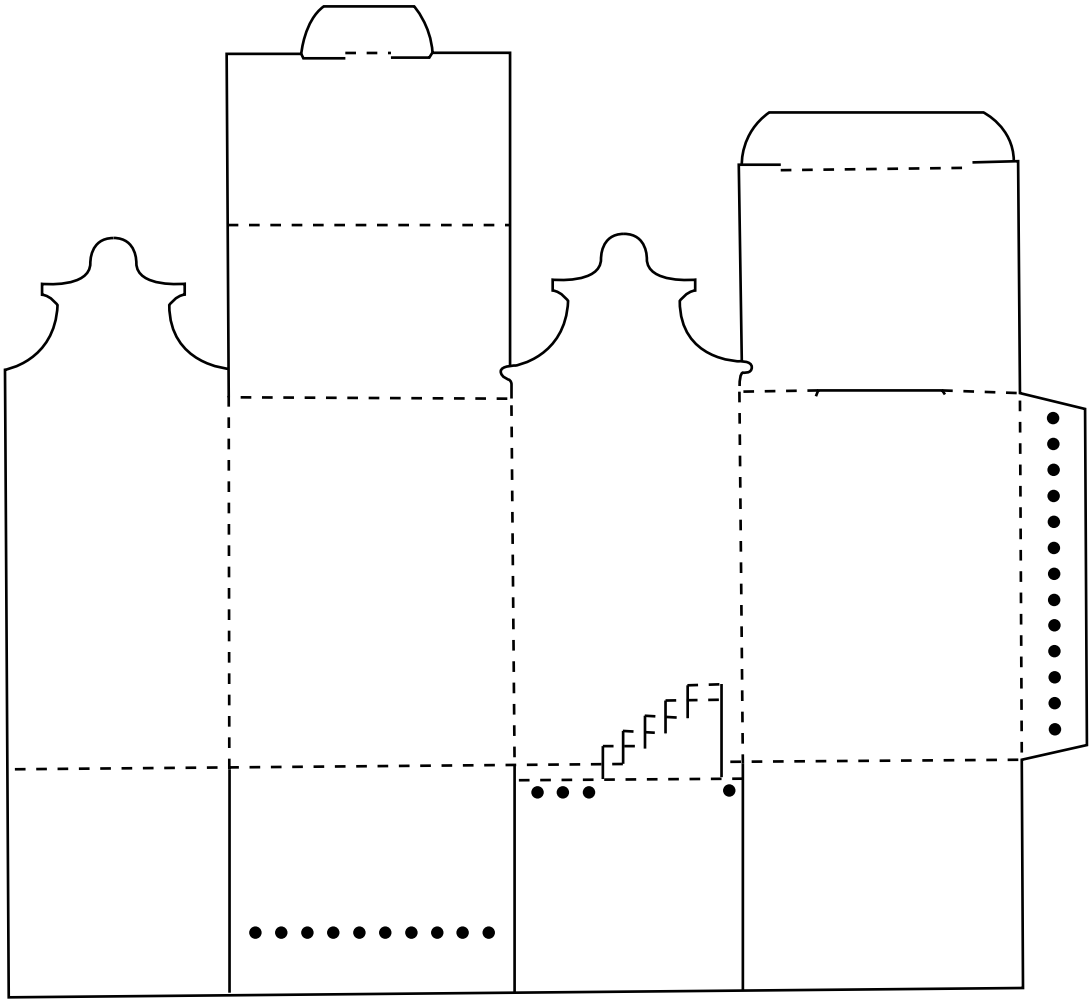


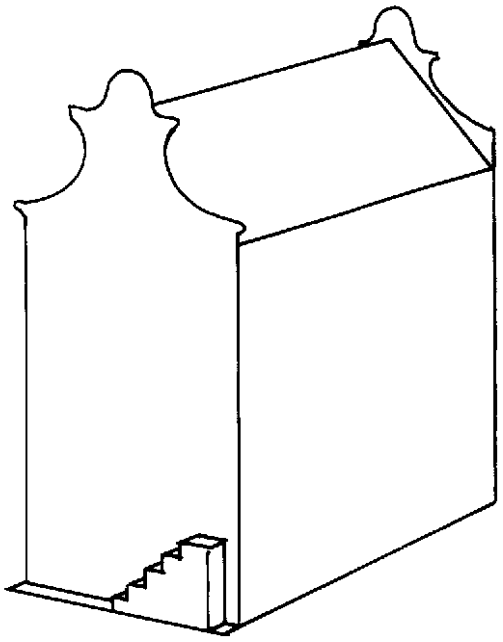
This package also requires no glue.



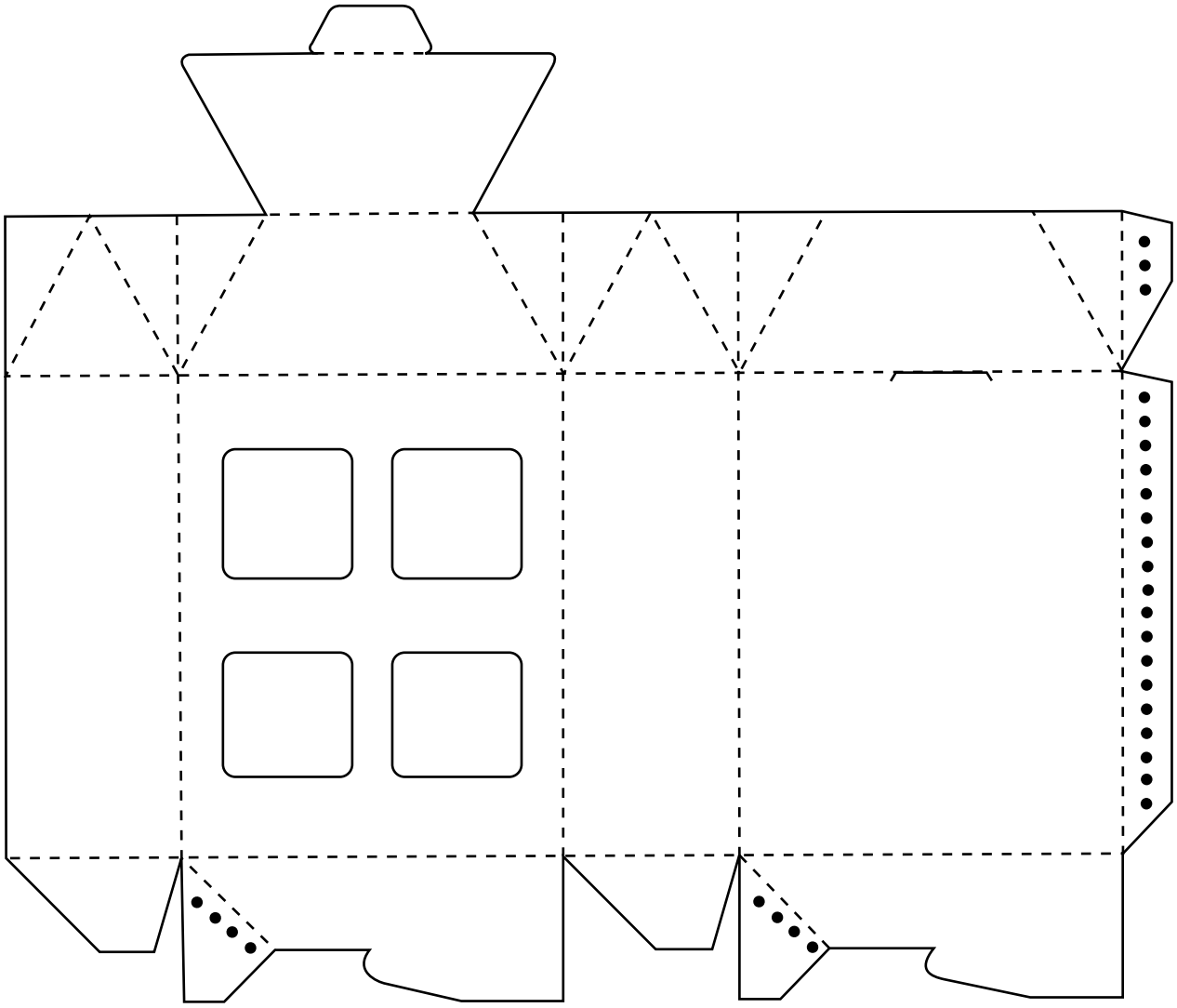


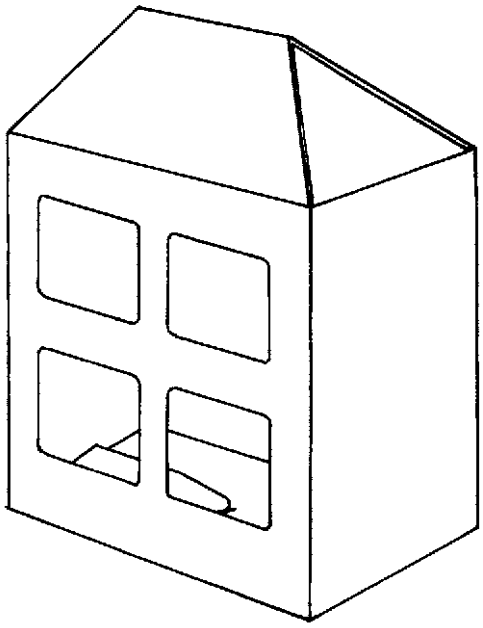
A container that depicts a traditional Dutch Burgher house makes an attractive keepsake.



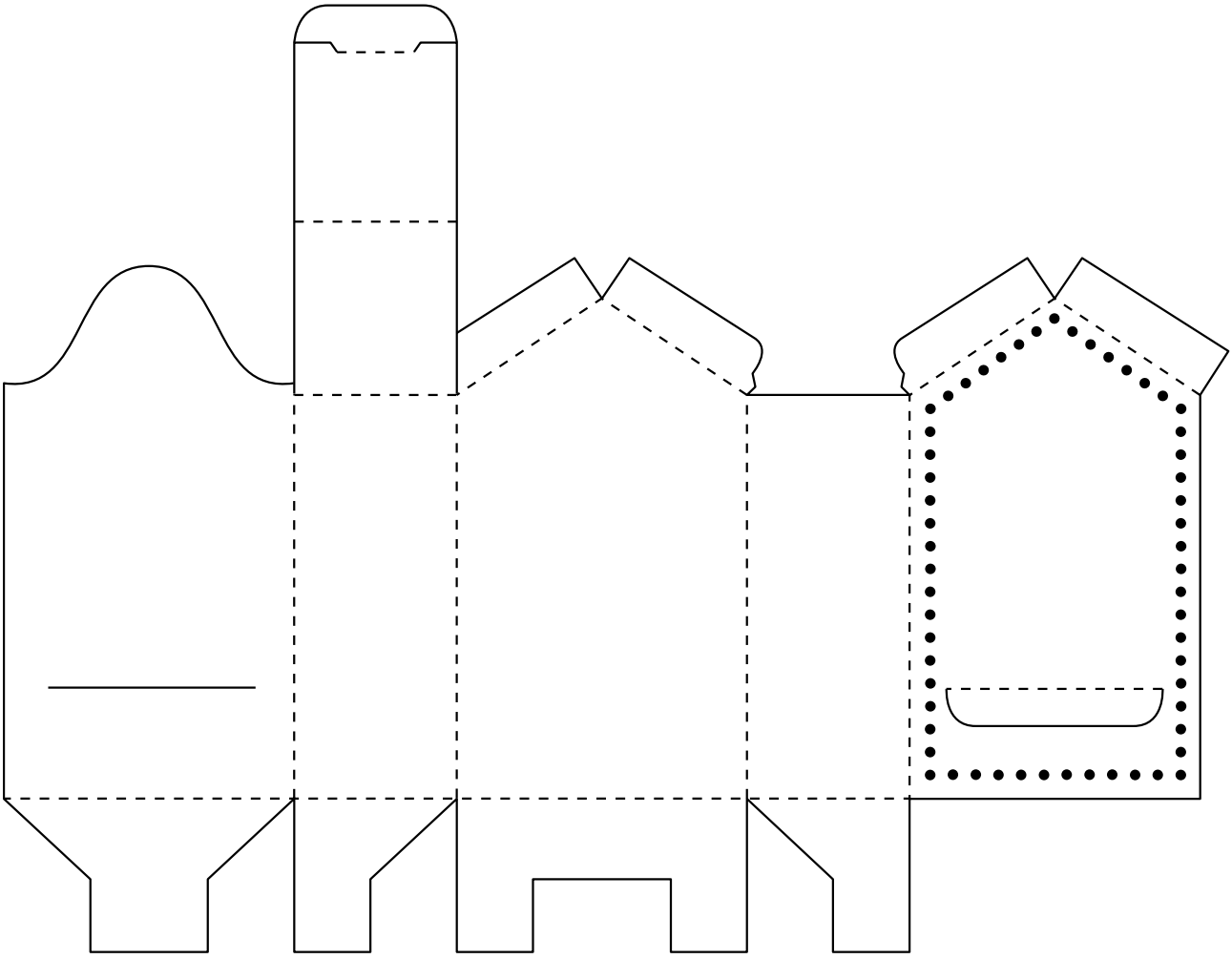


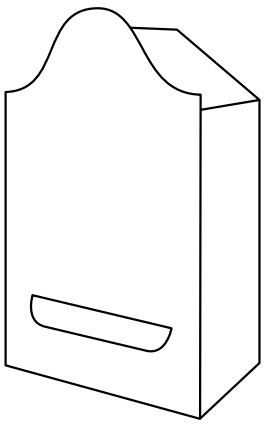
A somewhat more complex pattern could lead to a series of keepsakes.



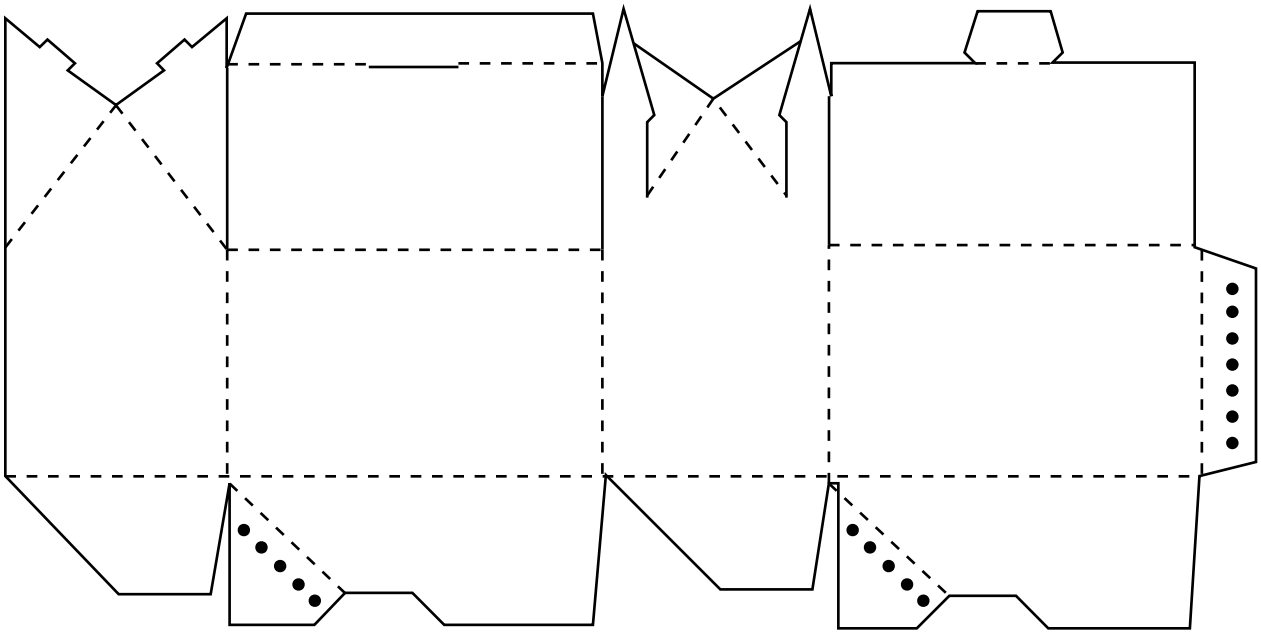


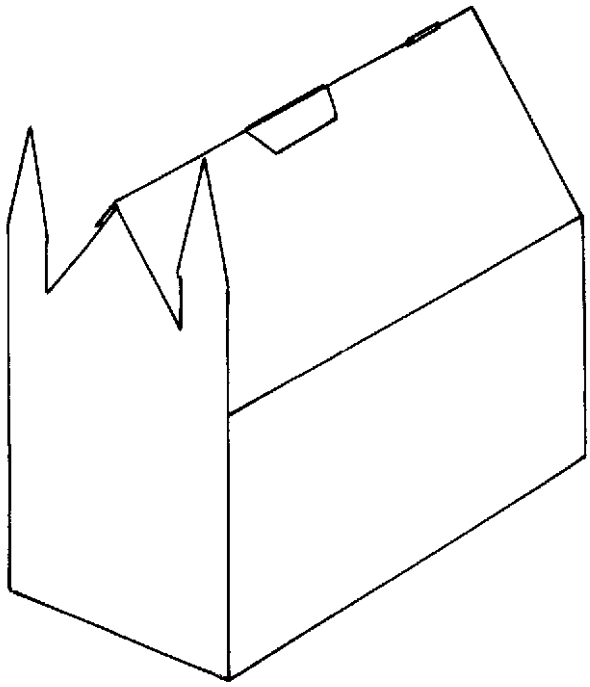
This package lends itself to recreations of famous buildings by means of creative die-cutting of windows and graphics.



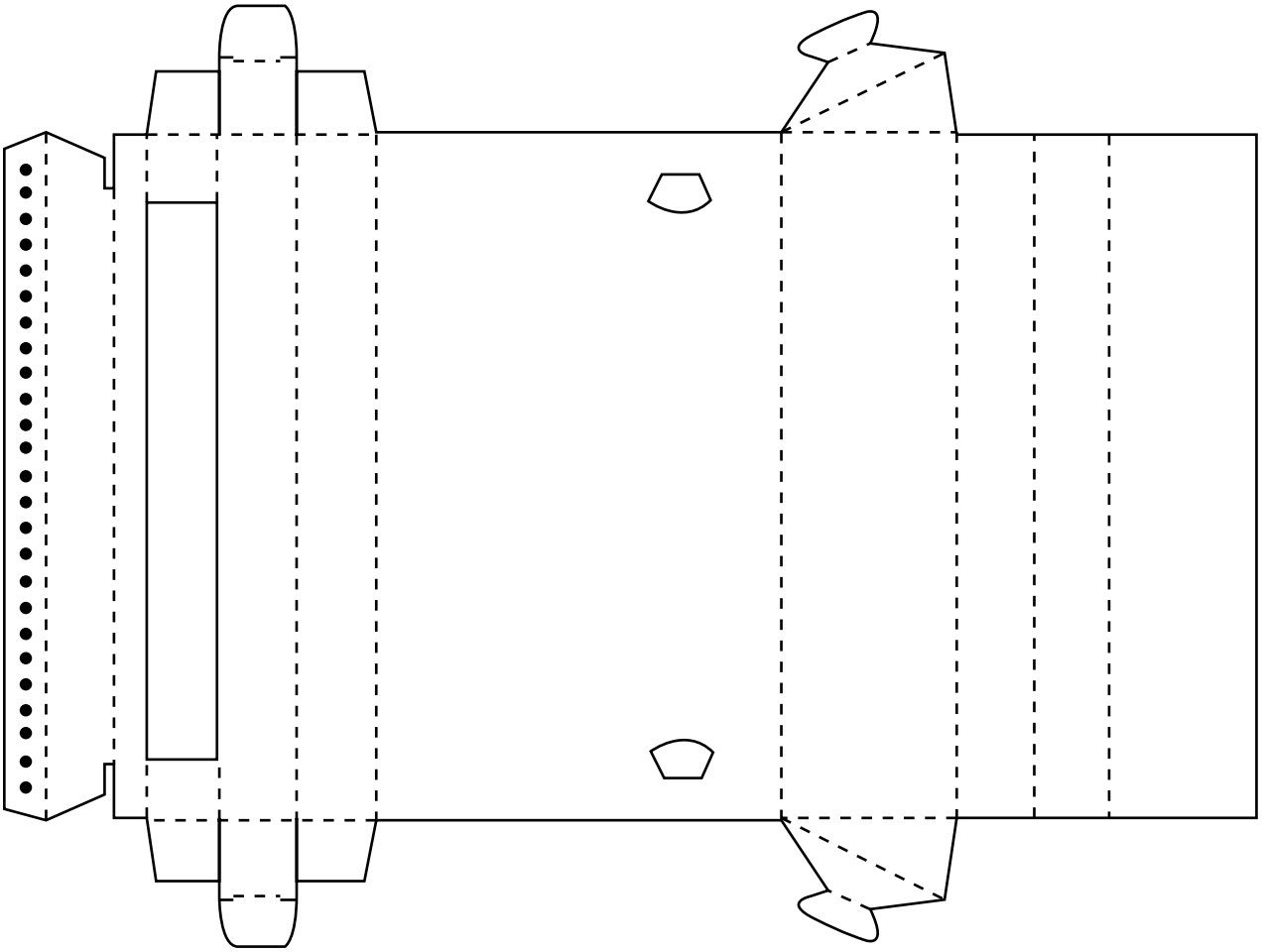


With the fifth panel we created an awning over the first "floor"

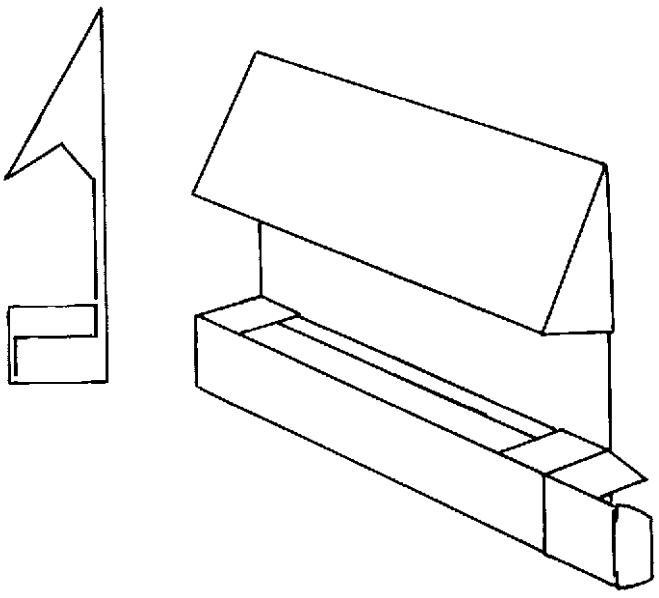


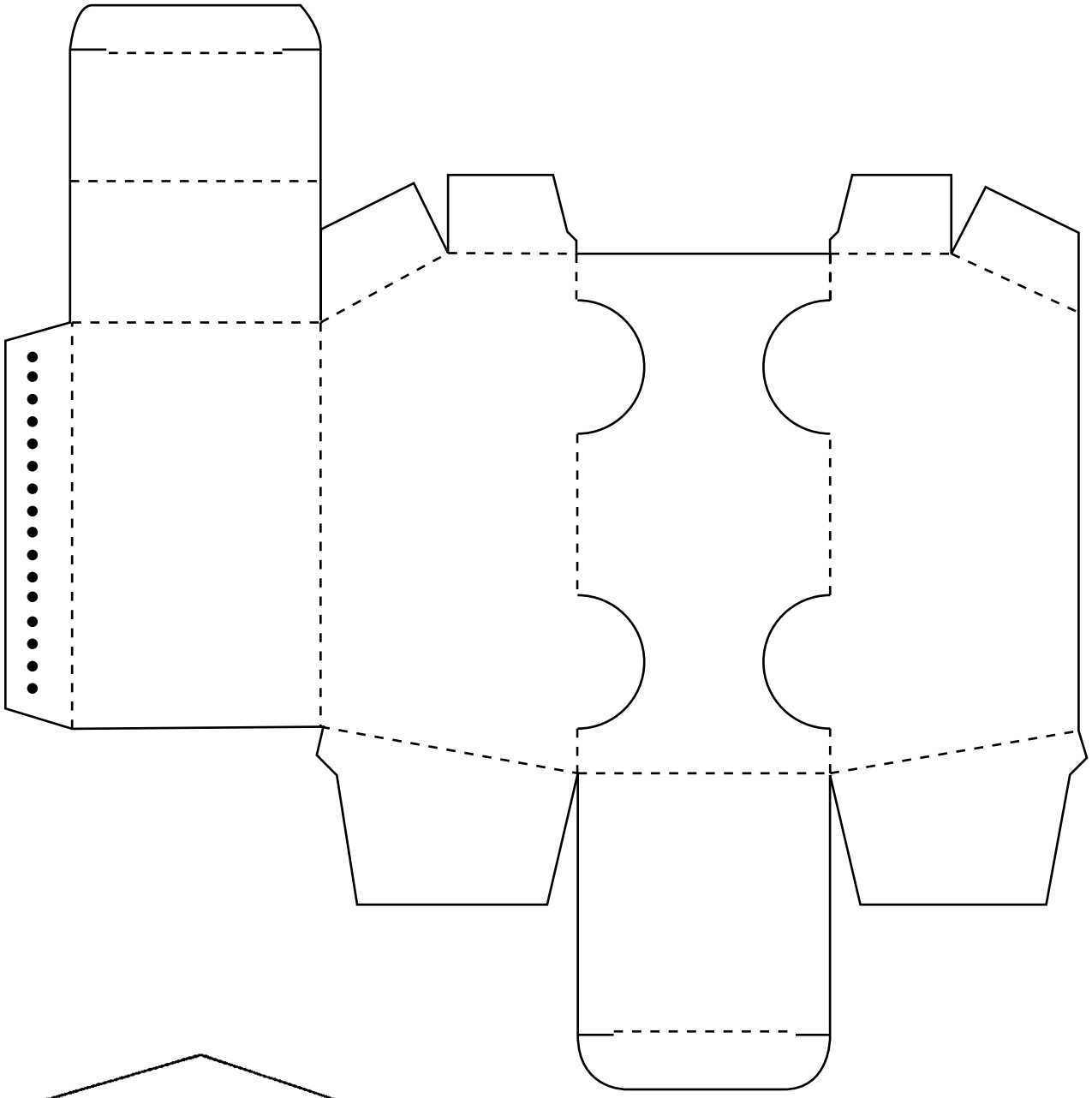


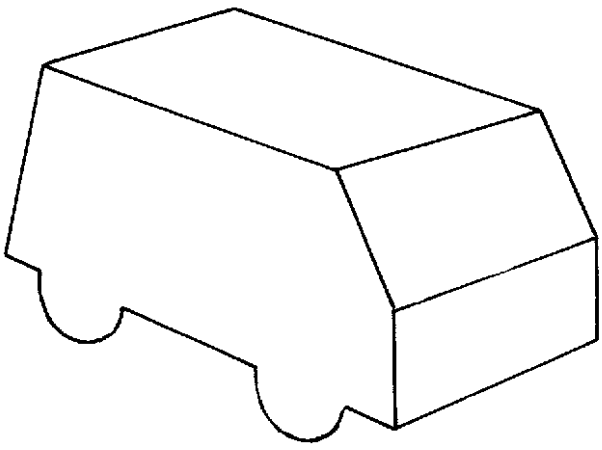
An alternative approach to the pattern on the preceding page.



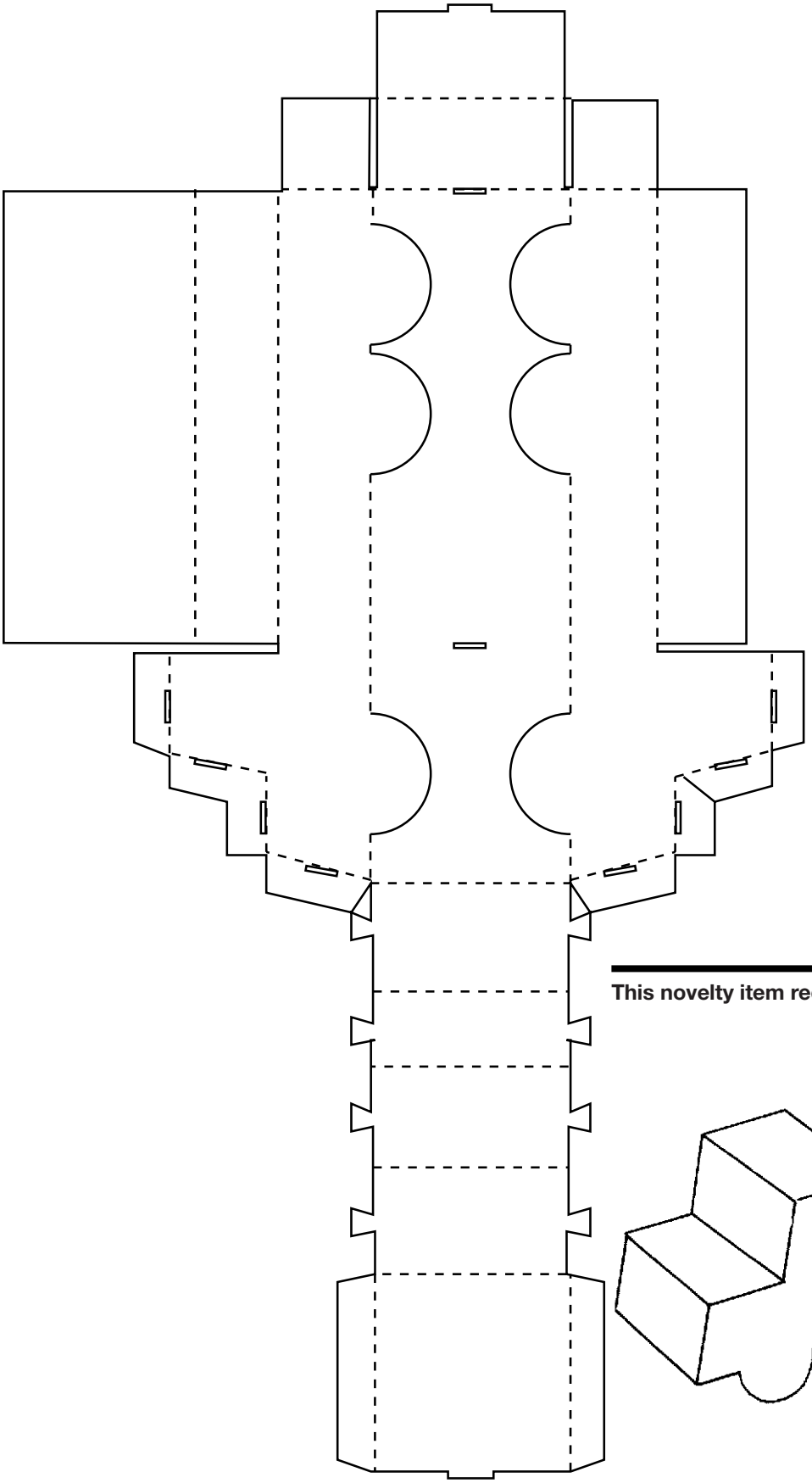
This little flower stall is an ideal package for cosmetics.



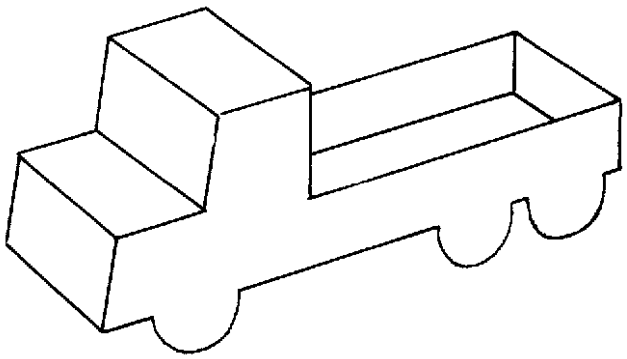


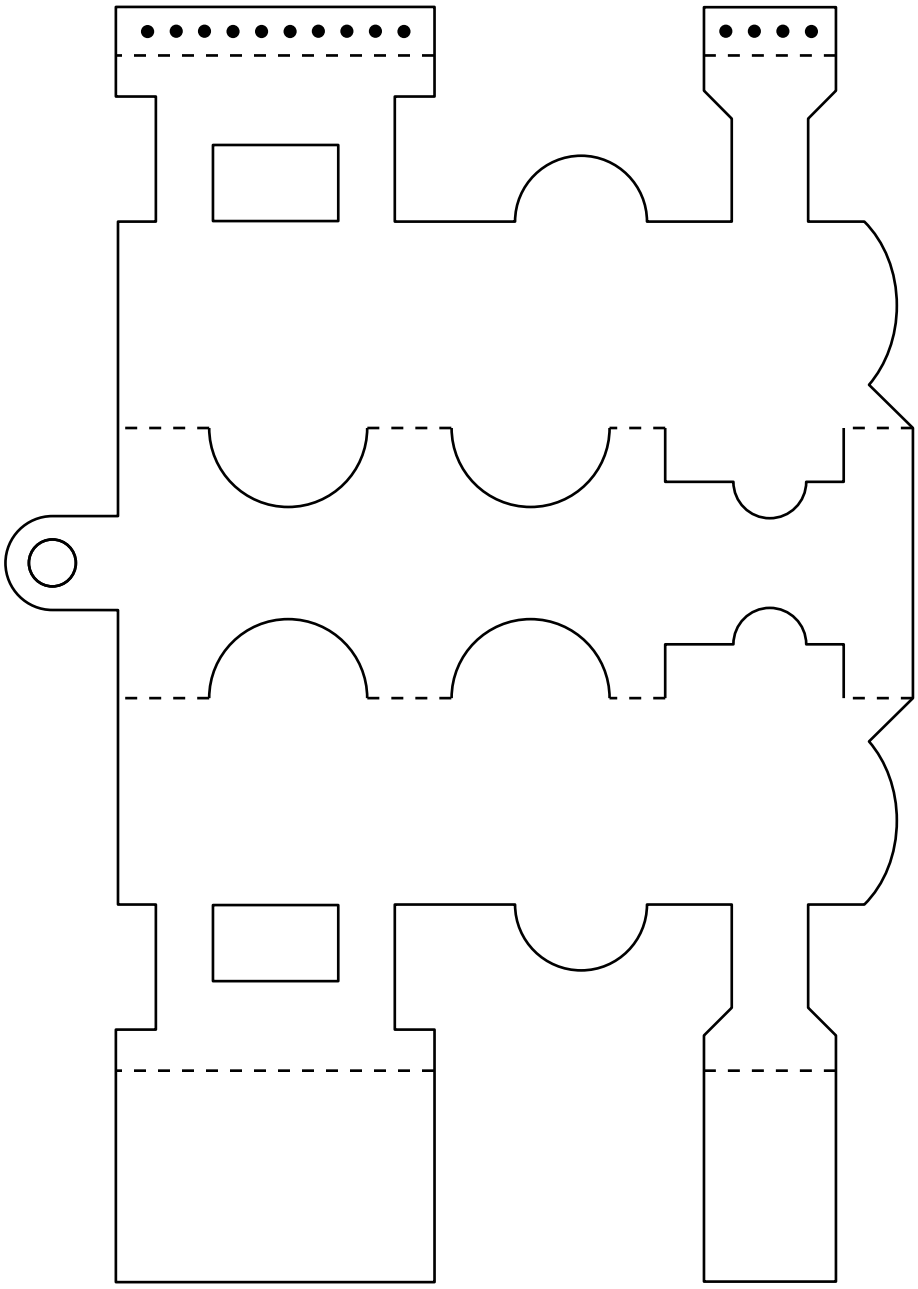


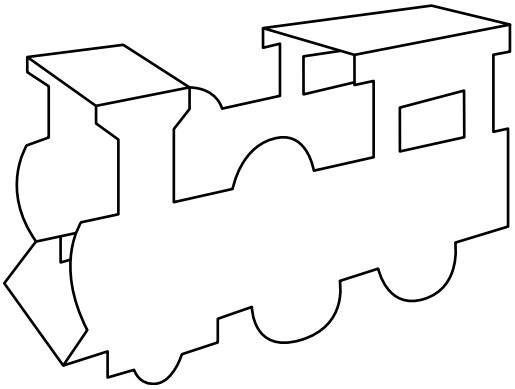
The shape of this box speaks for itself. An inserted pouch will make up for the holes created by the die-cut wheels.



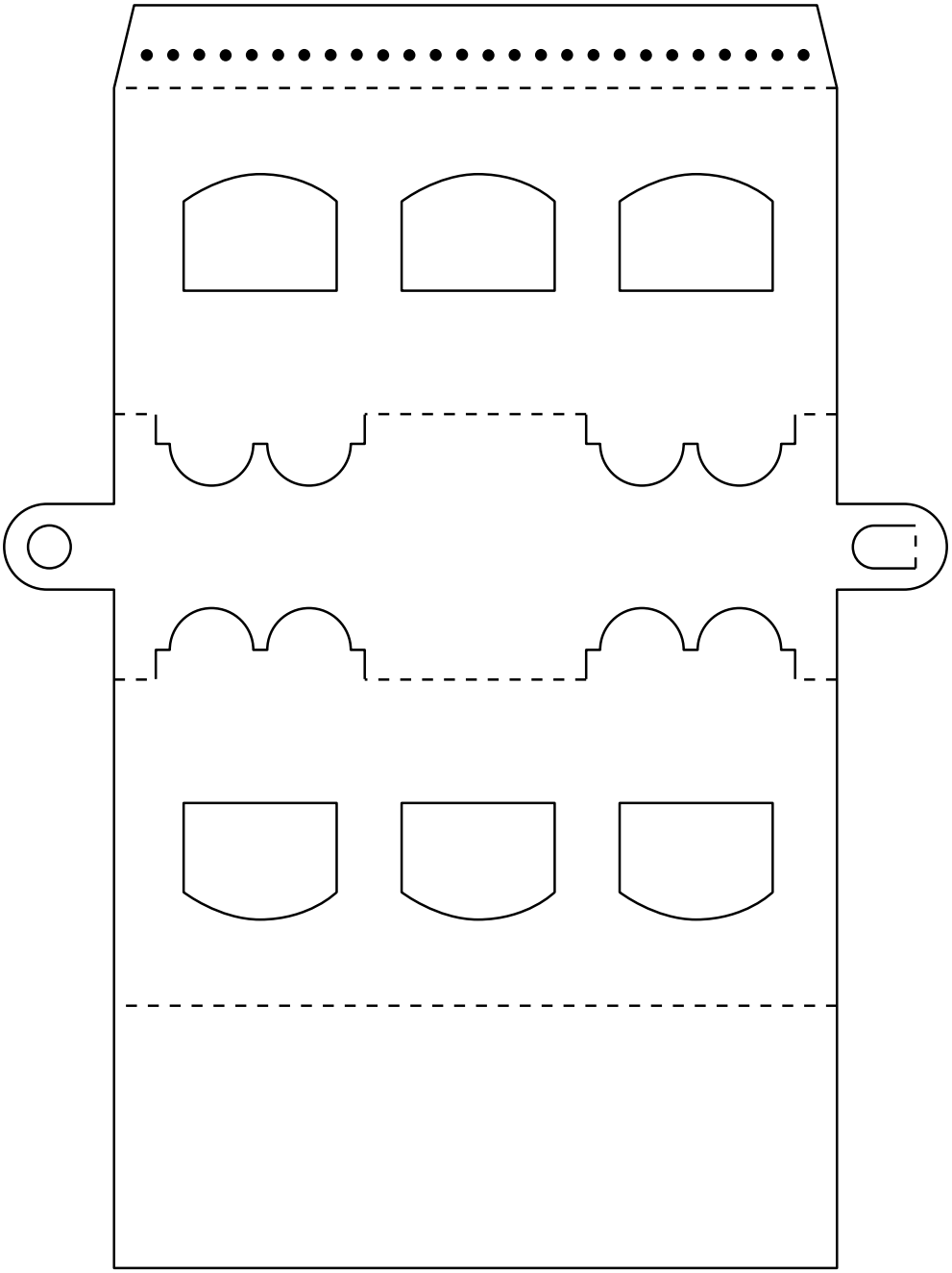
This novelty item requires no glue.

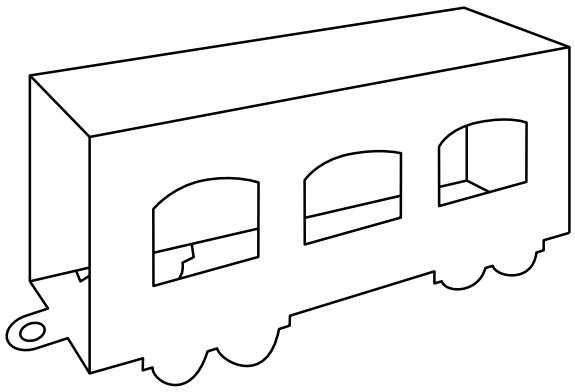


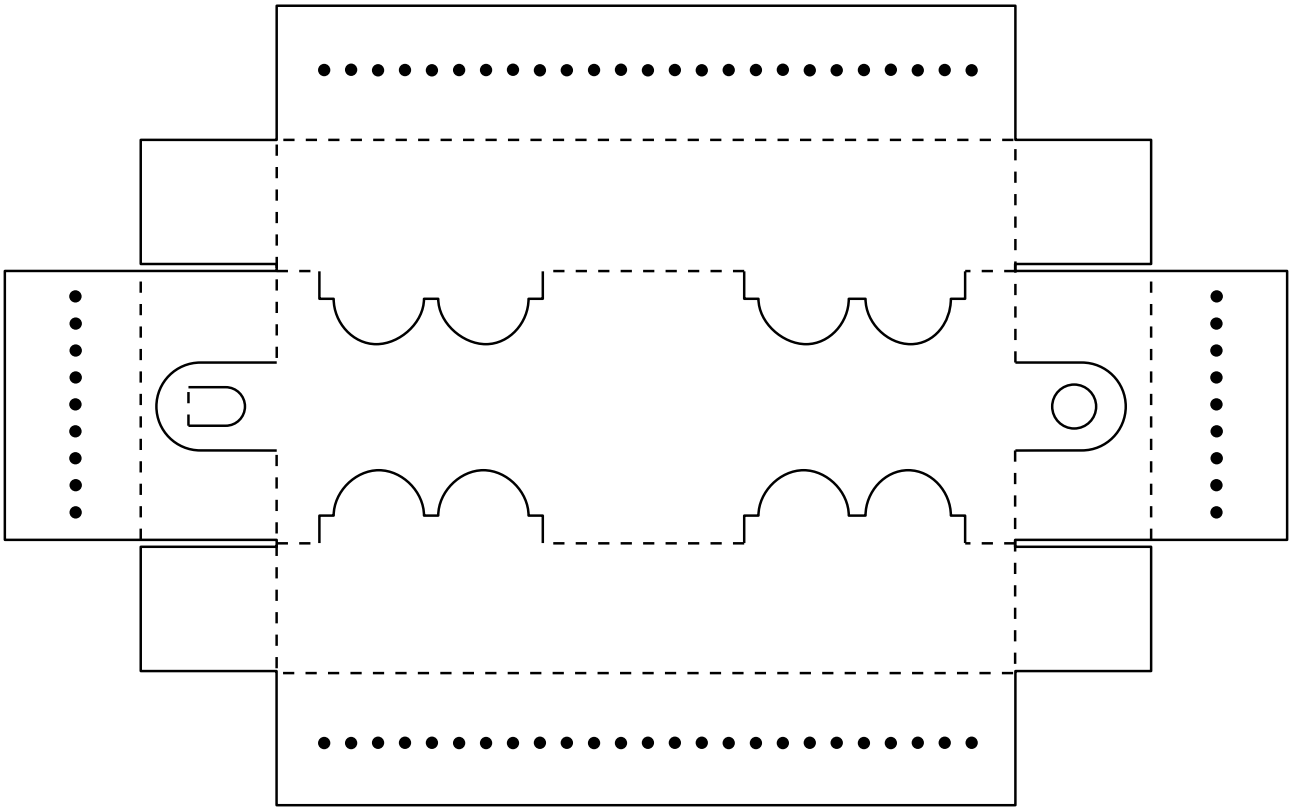


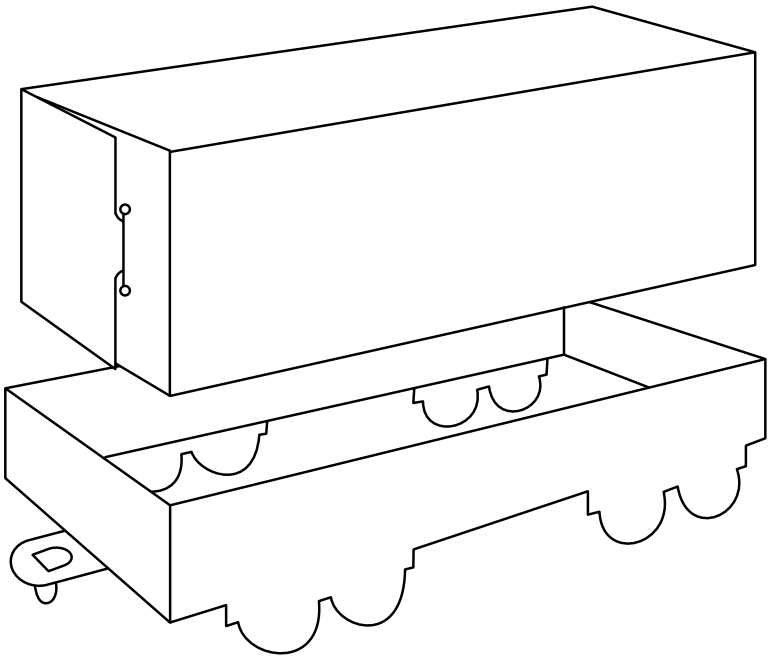


RAILROAD COACH

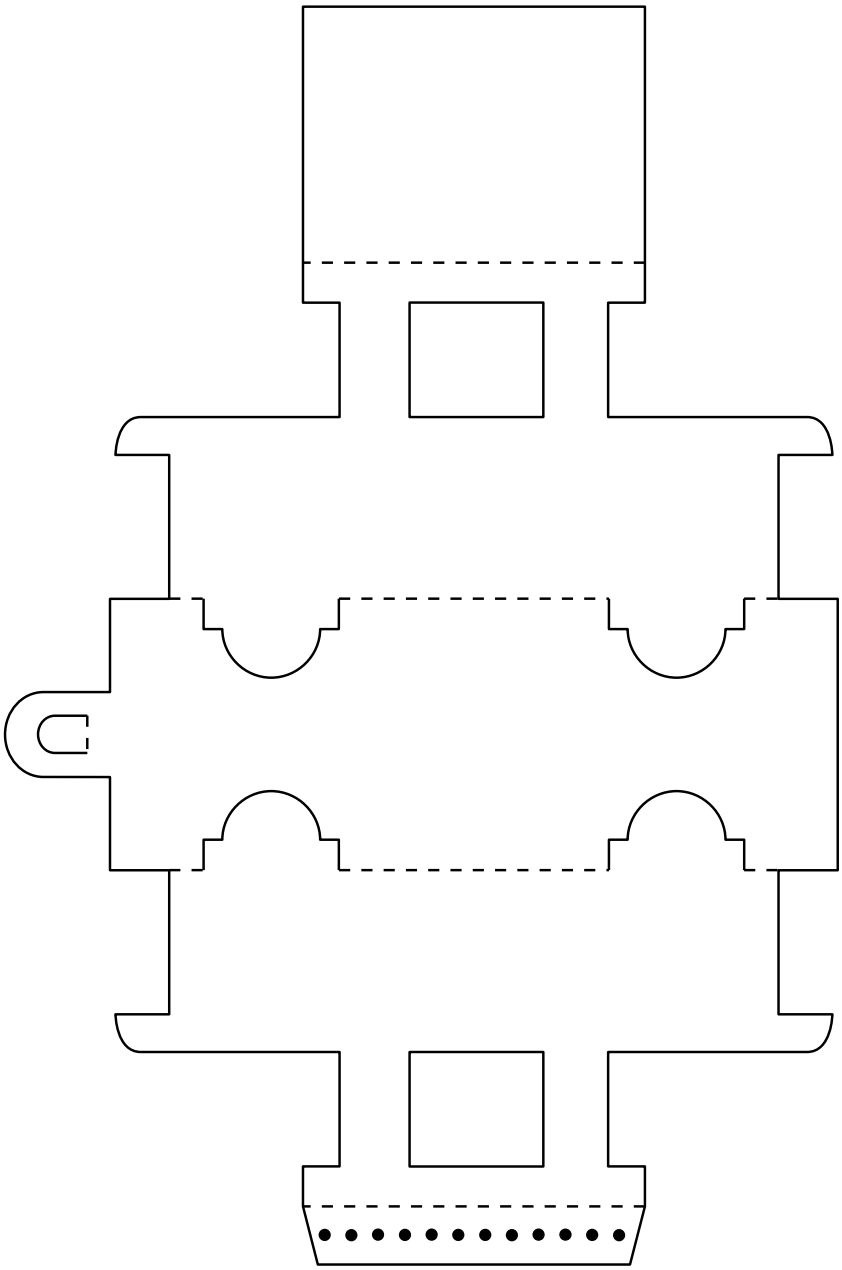


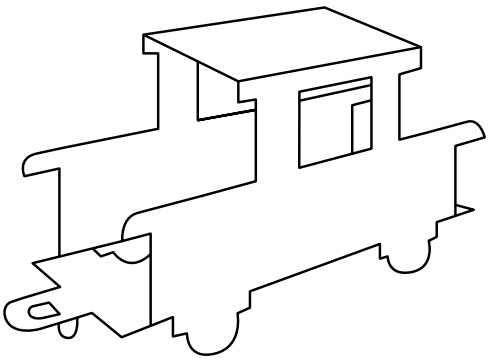


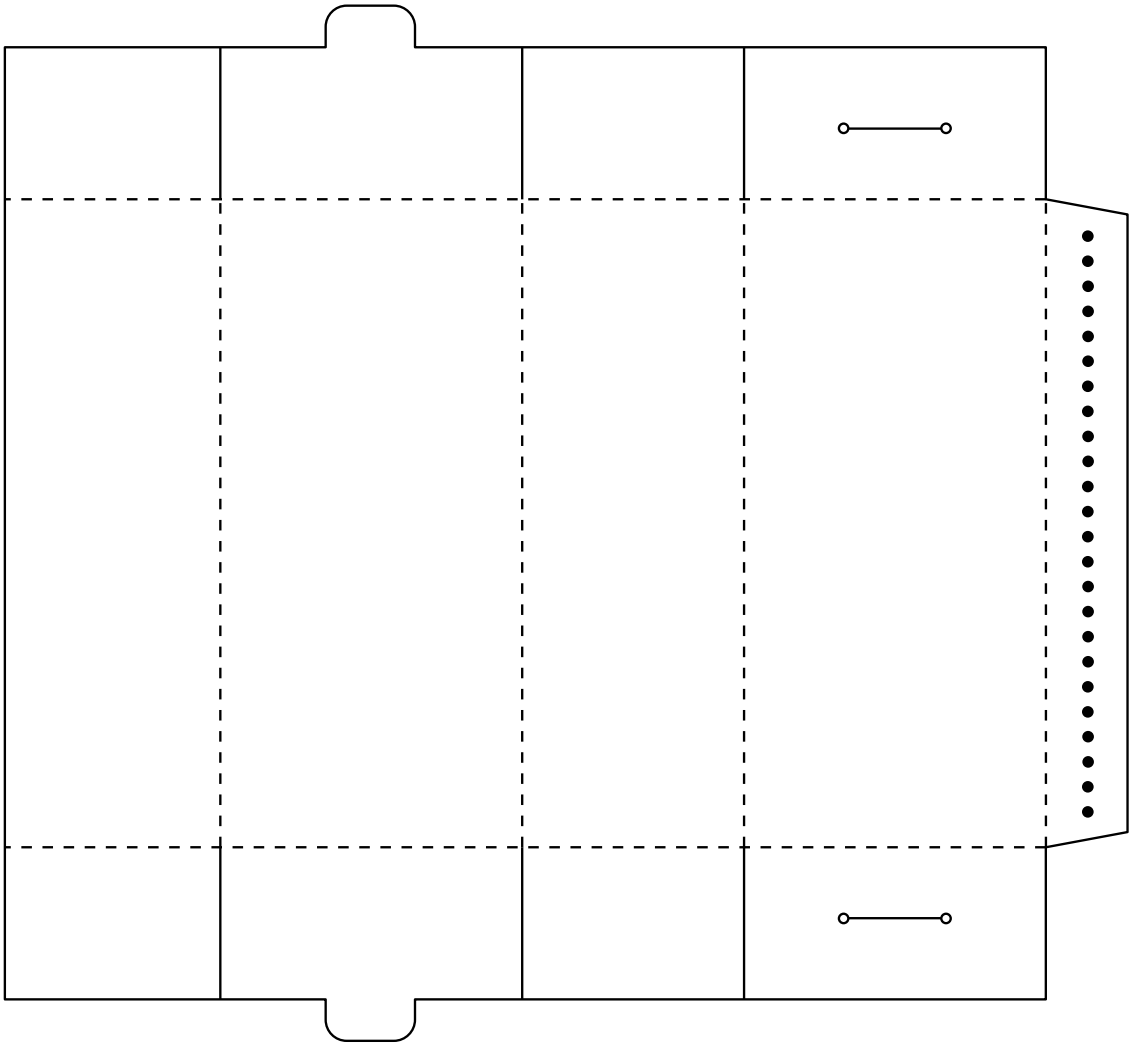


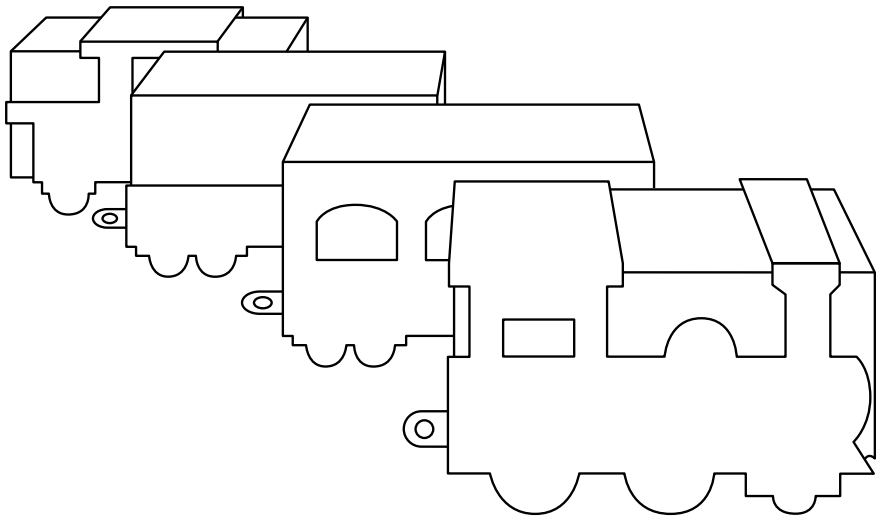


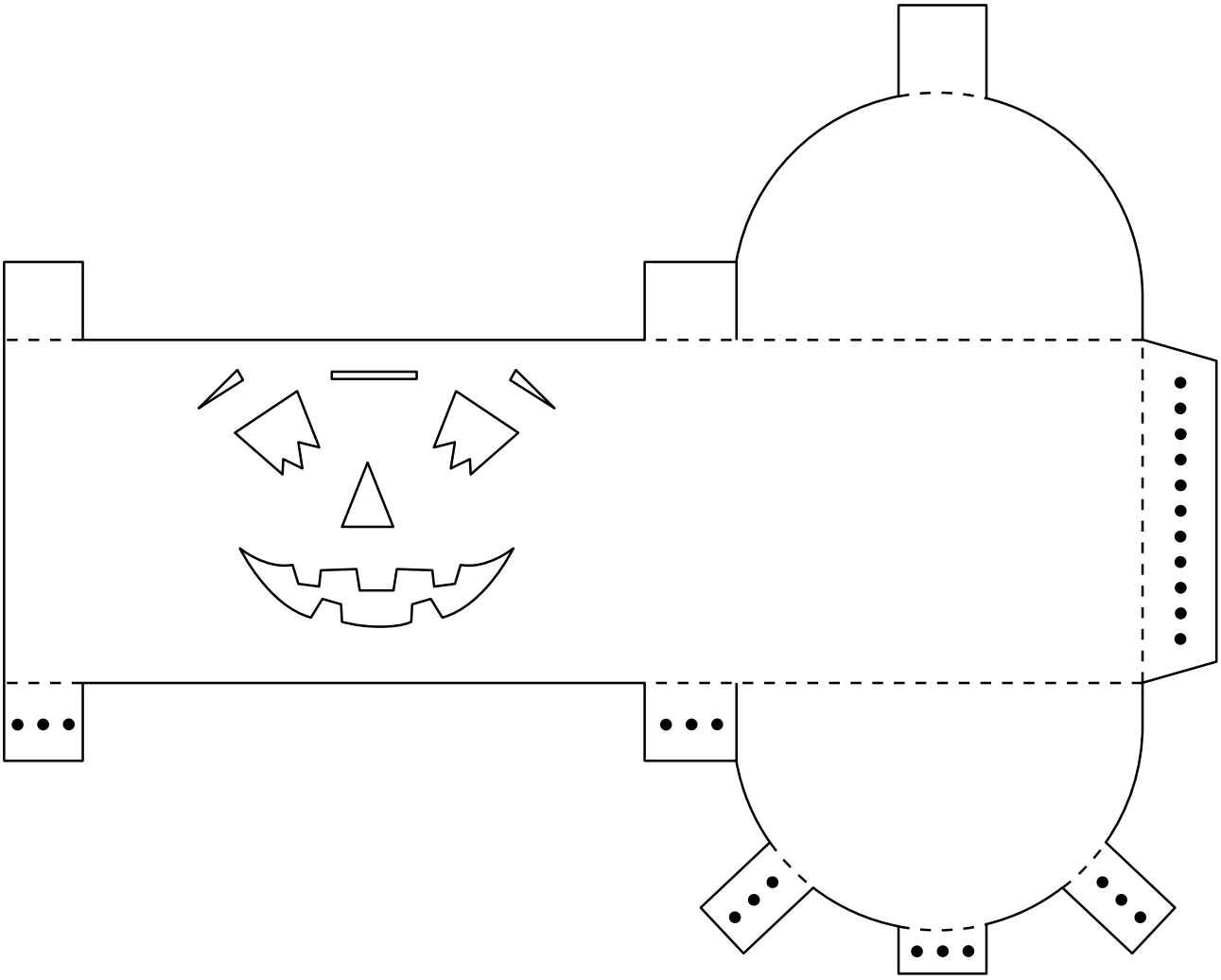
RAILROAD CABOOSE

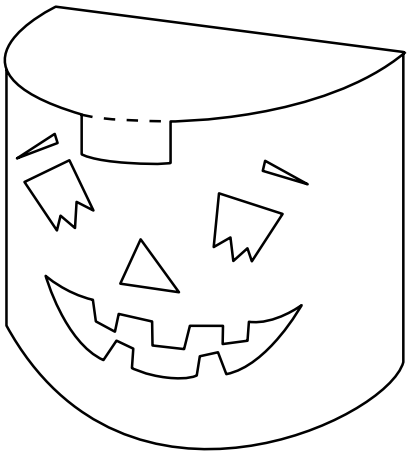




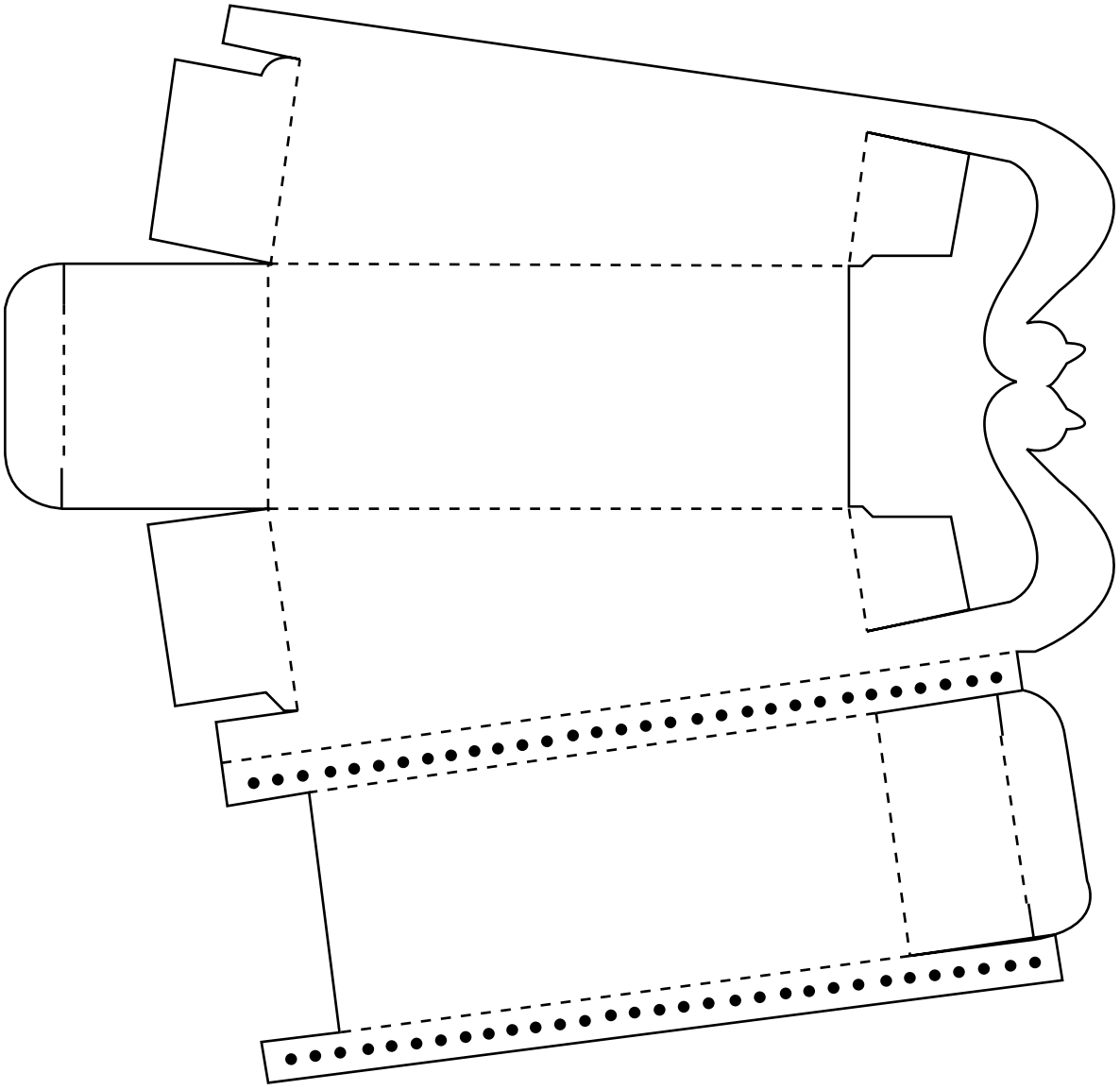




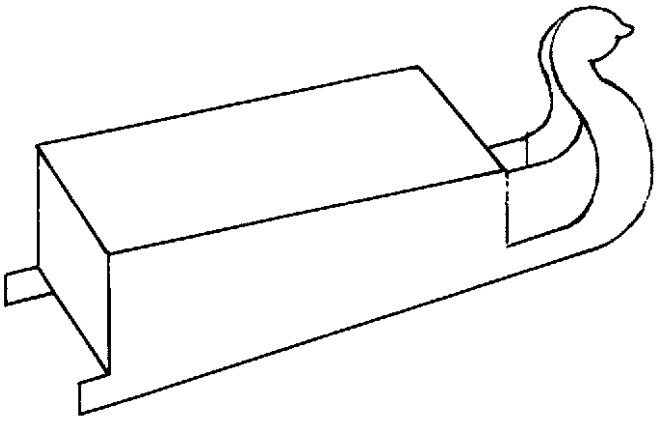


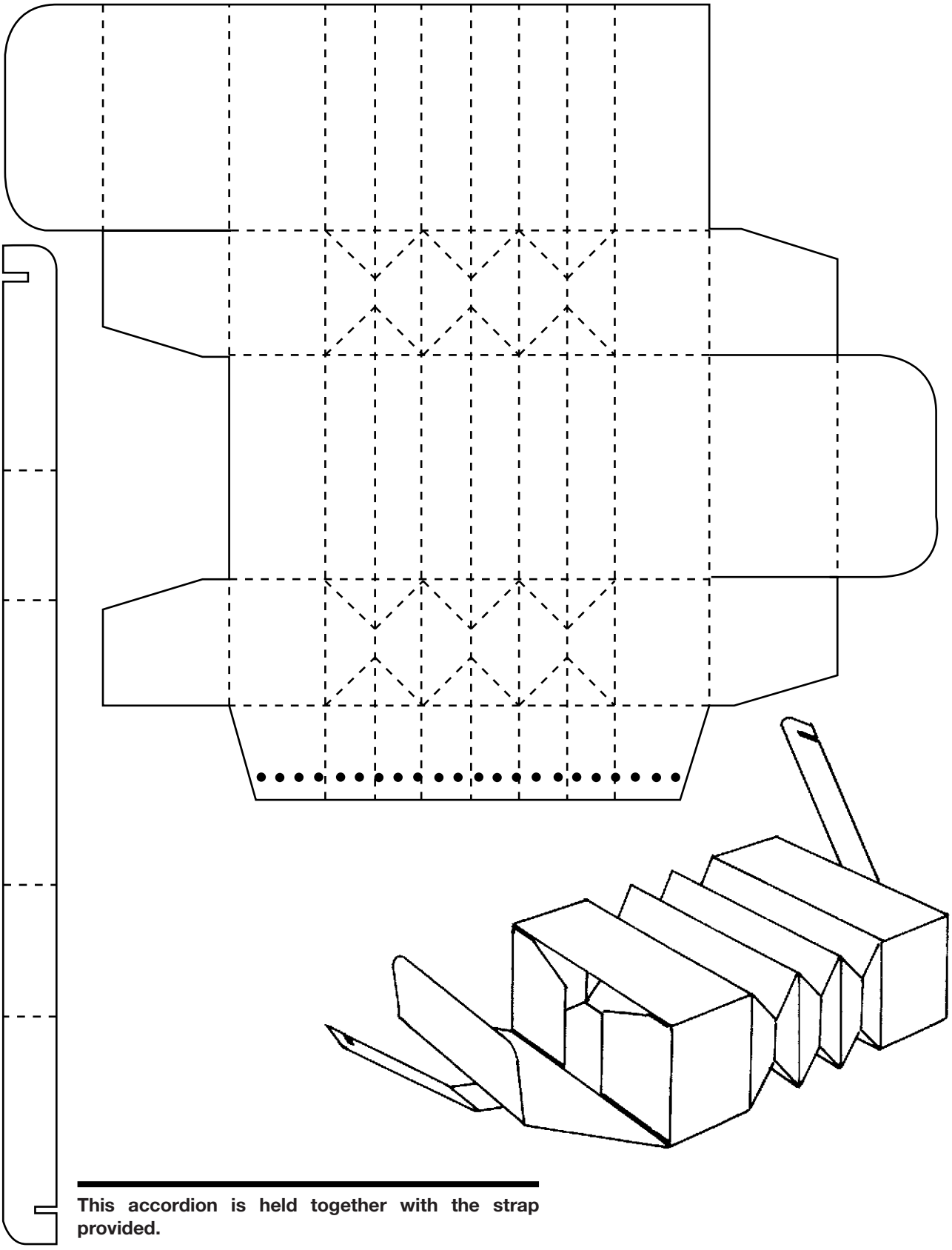


The die-cut images on the front may be altered to suit the occasion



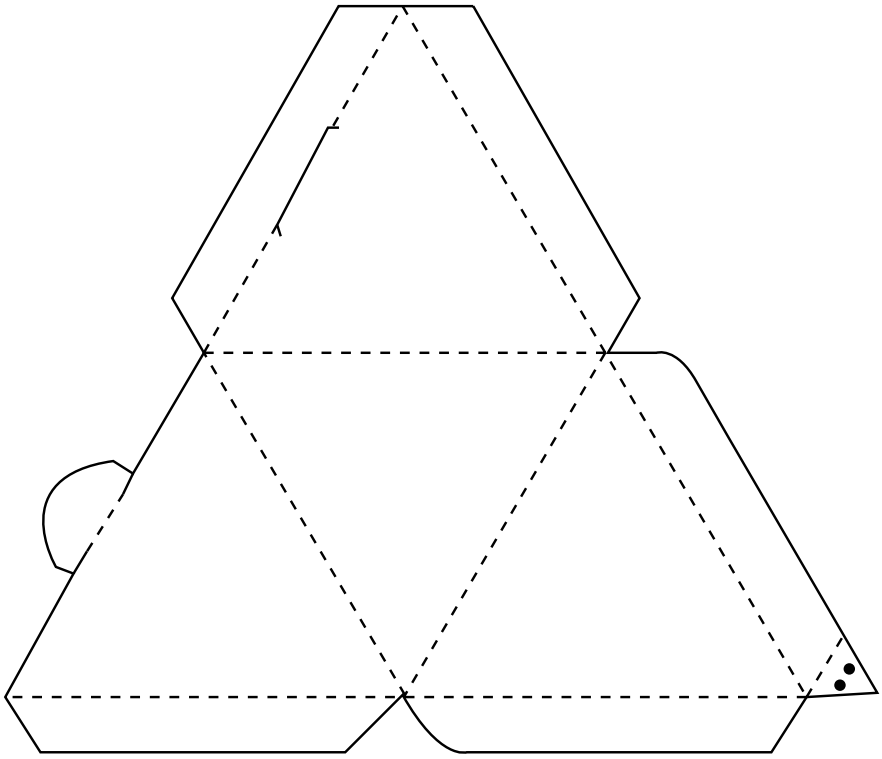
This old-fashioned sleigh has graphic application possibilities.

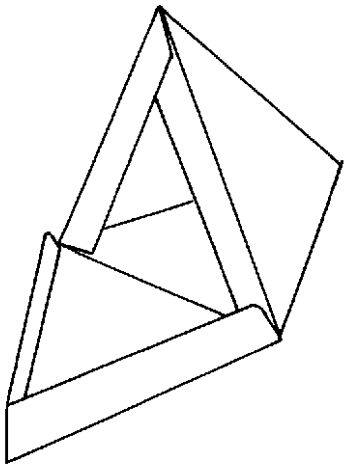




This accordion is held together with the strap provided.

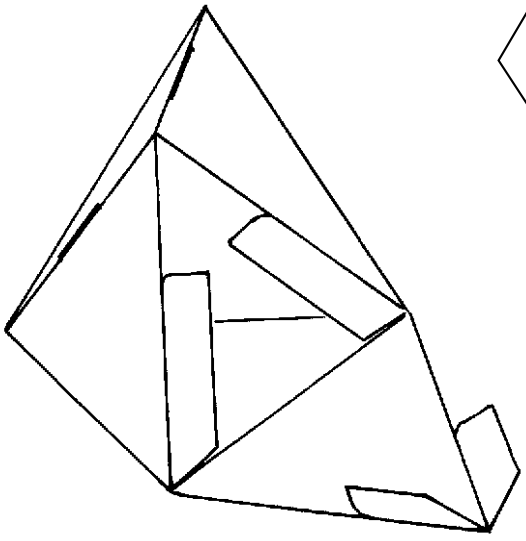
TETRAHEDRON



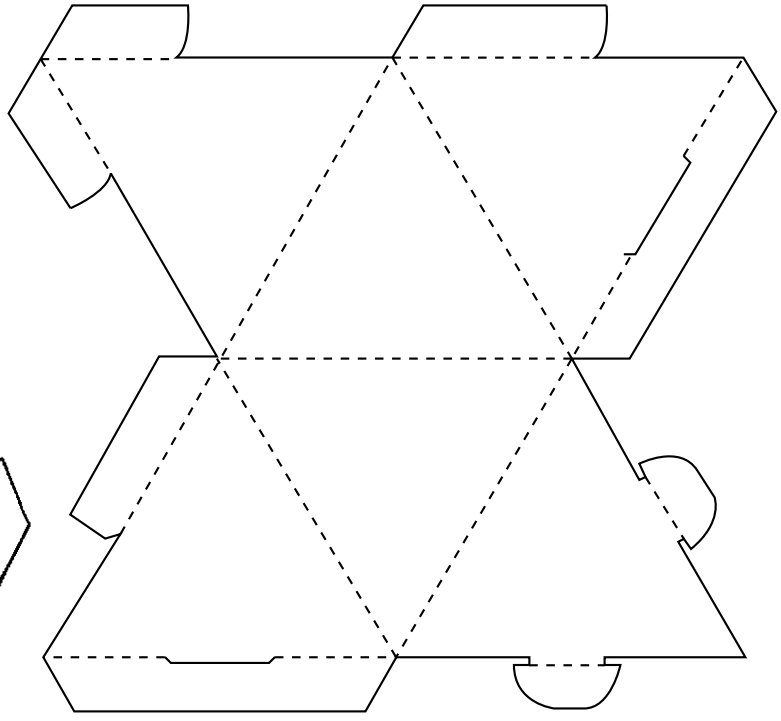


Spot gluing of the flap off the lid helps keep the package closed.

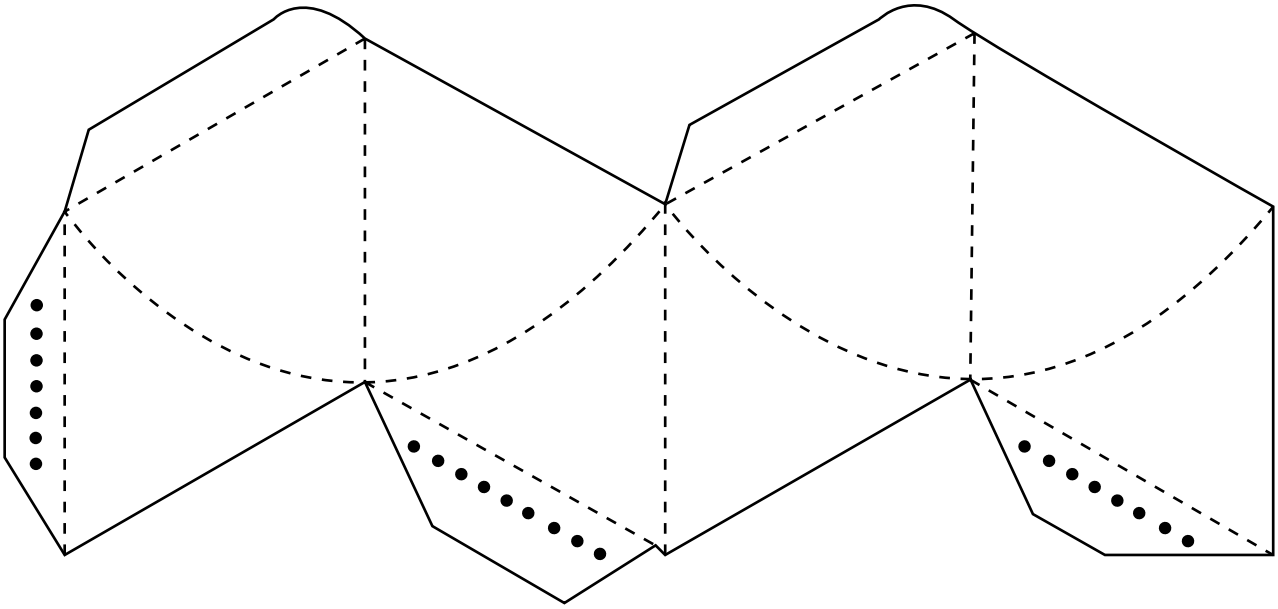
TRIANGULAR DIPYRAMID

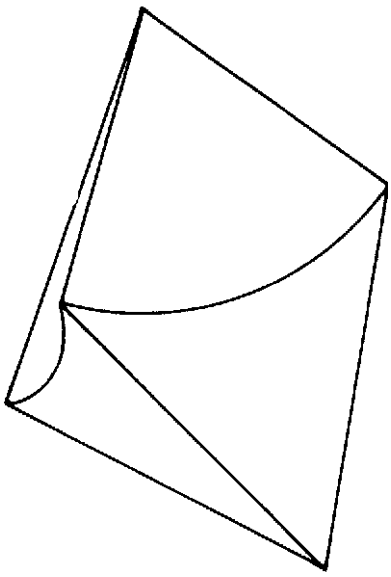


The flaps off the lid lock into the shortened dustflaps.

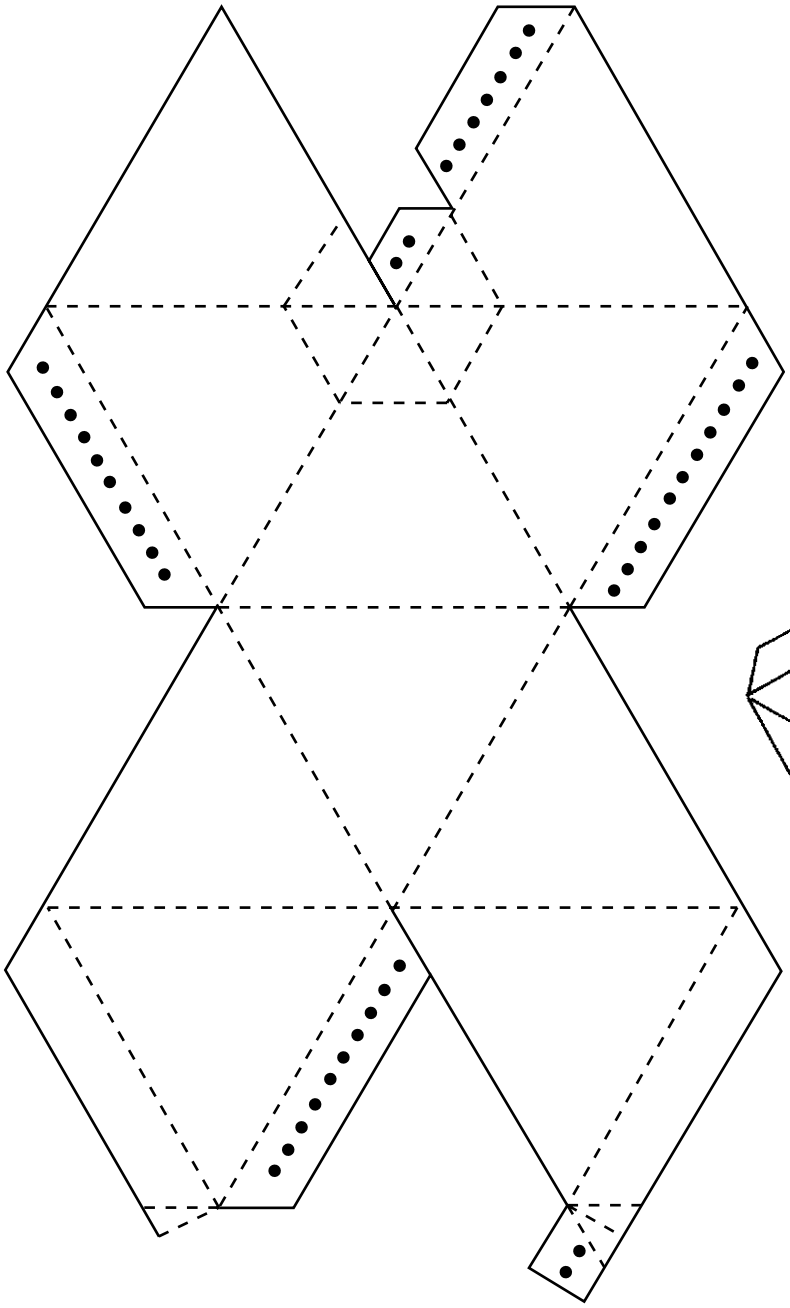


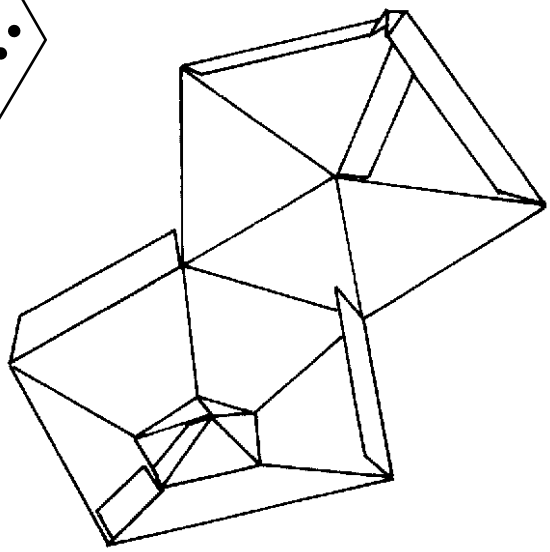
DIPYRAMID

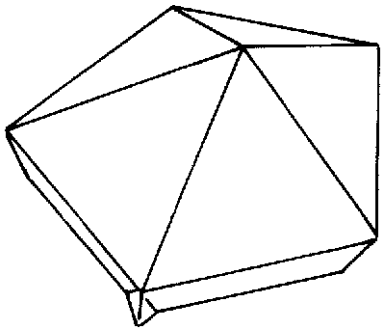




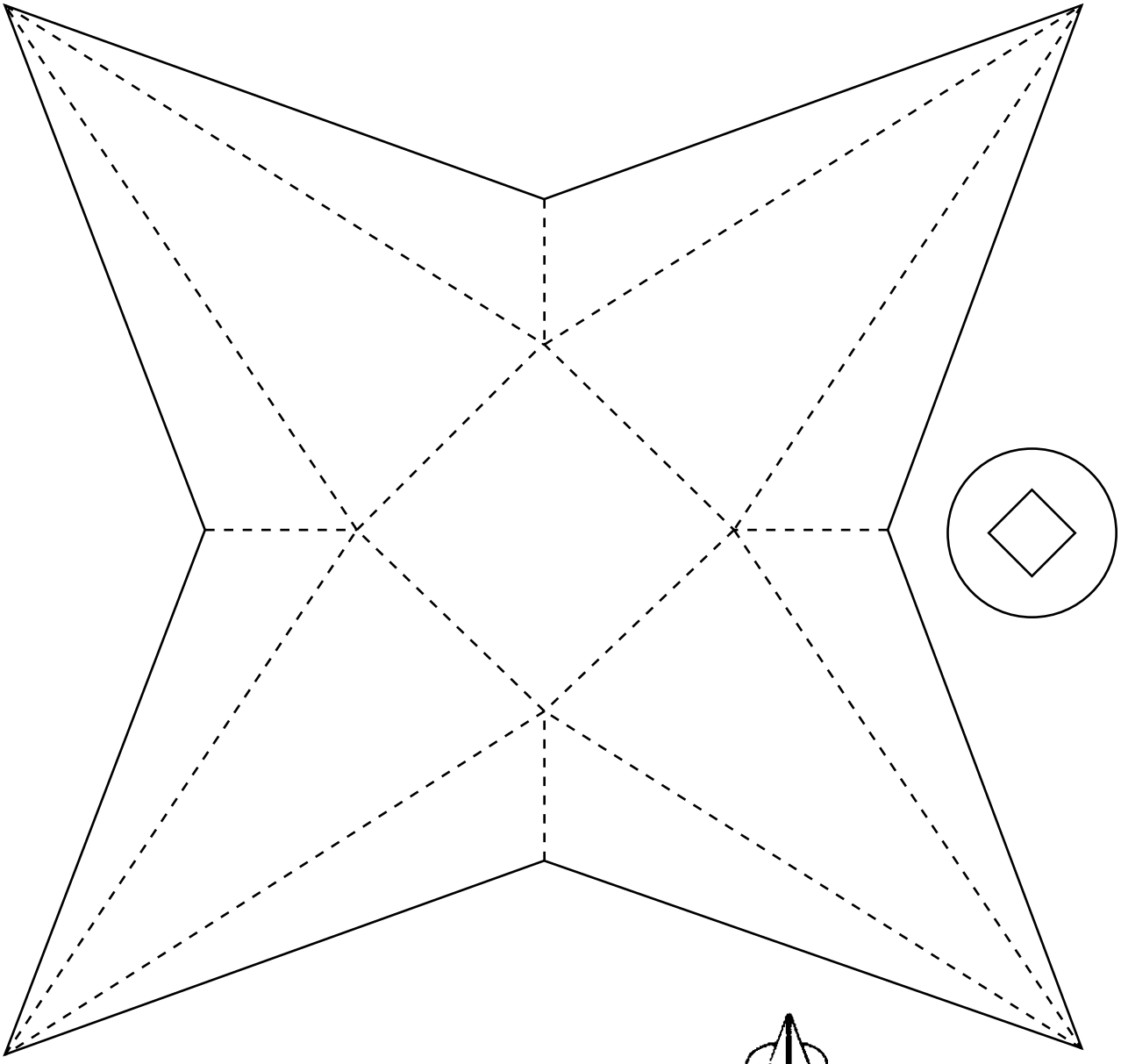
Straight and curved scores permit a wide range of variations.

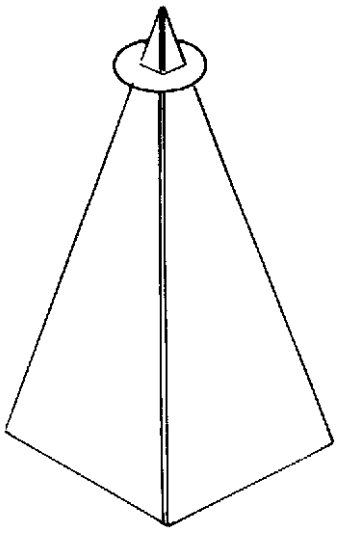




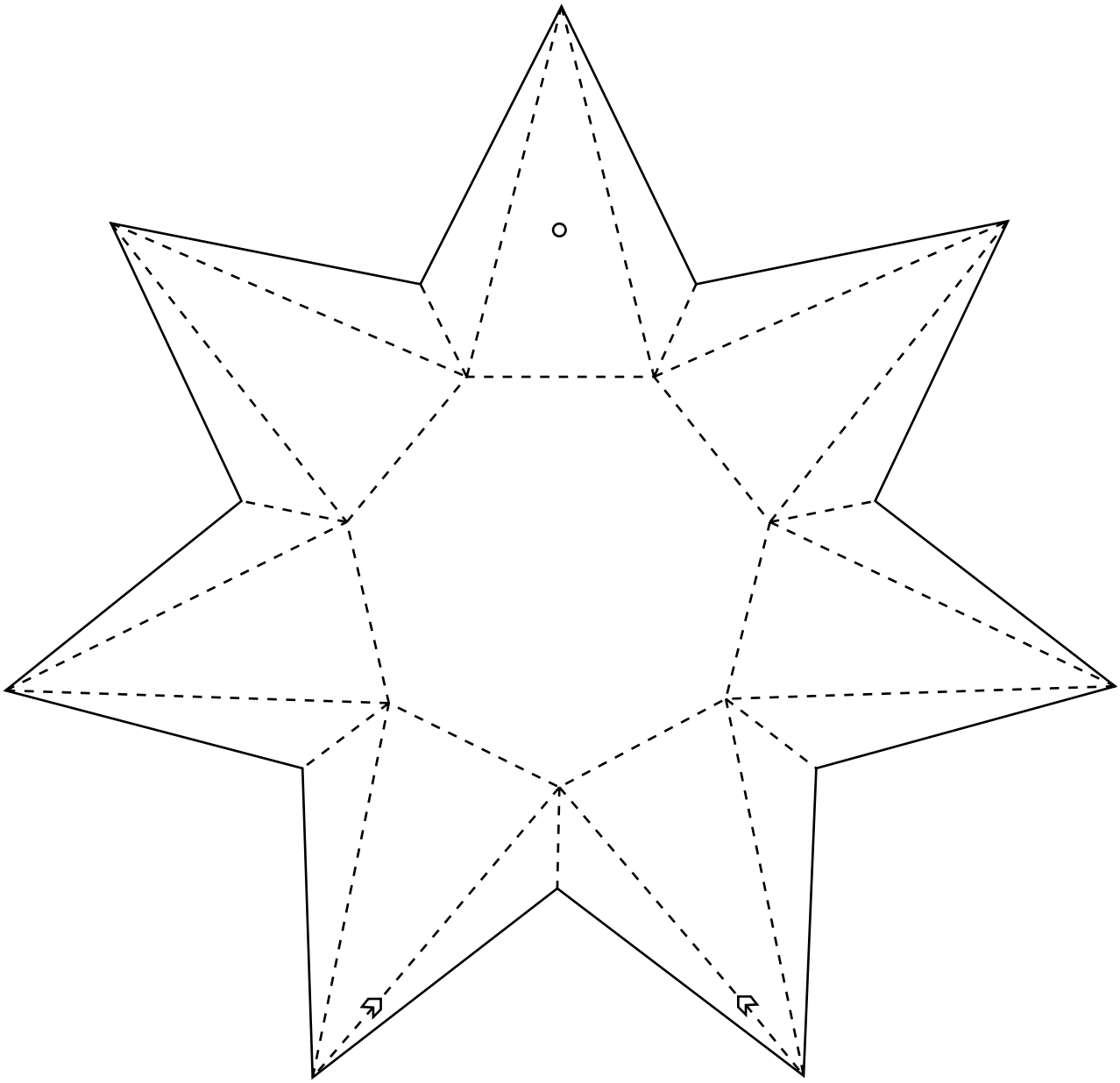


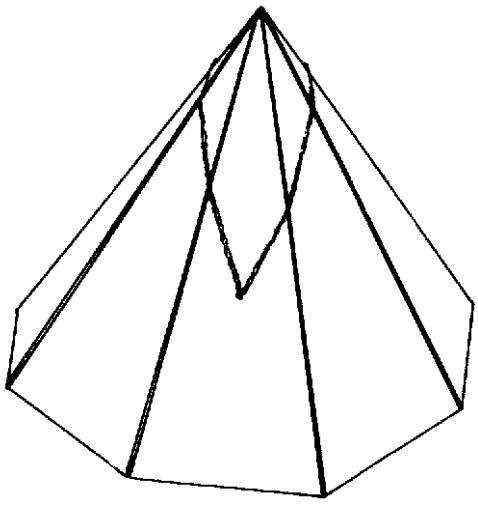
PYRAMID WITH GUSSETS





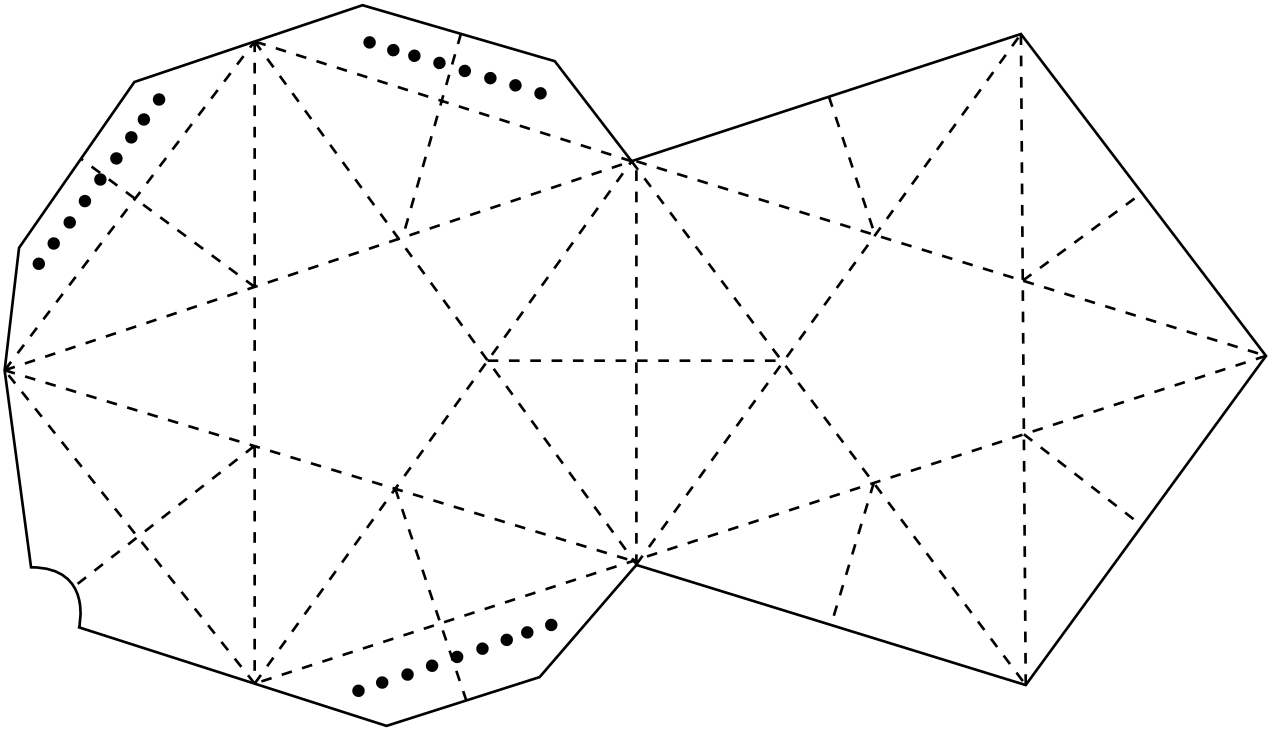
An inserted platform will allow this package to serve many functions.



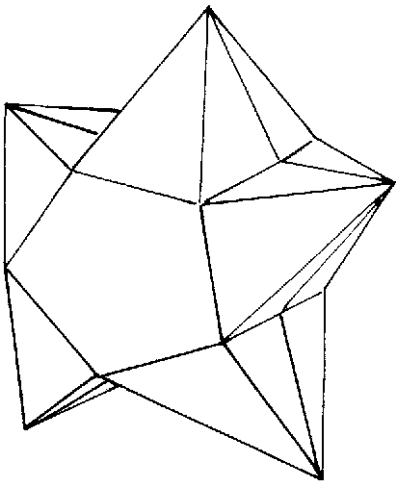


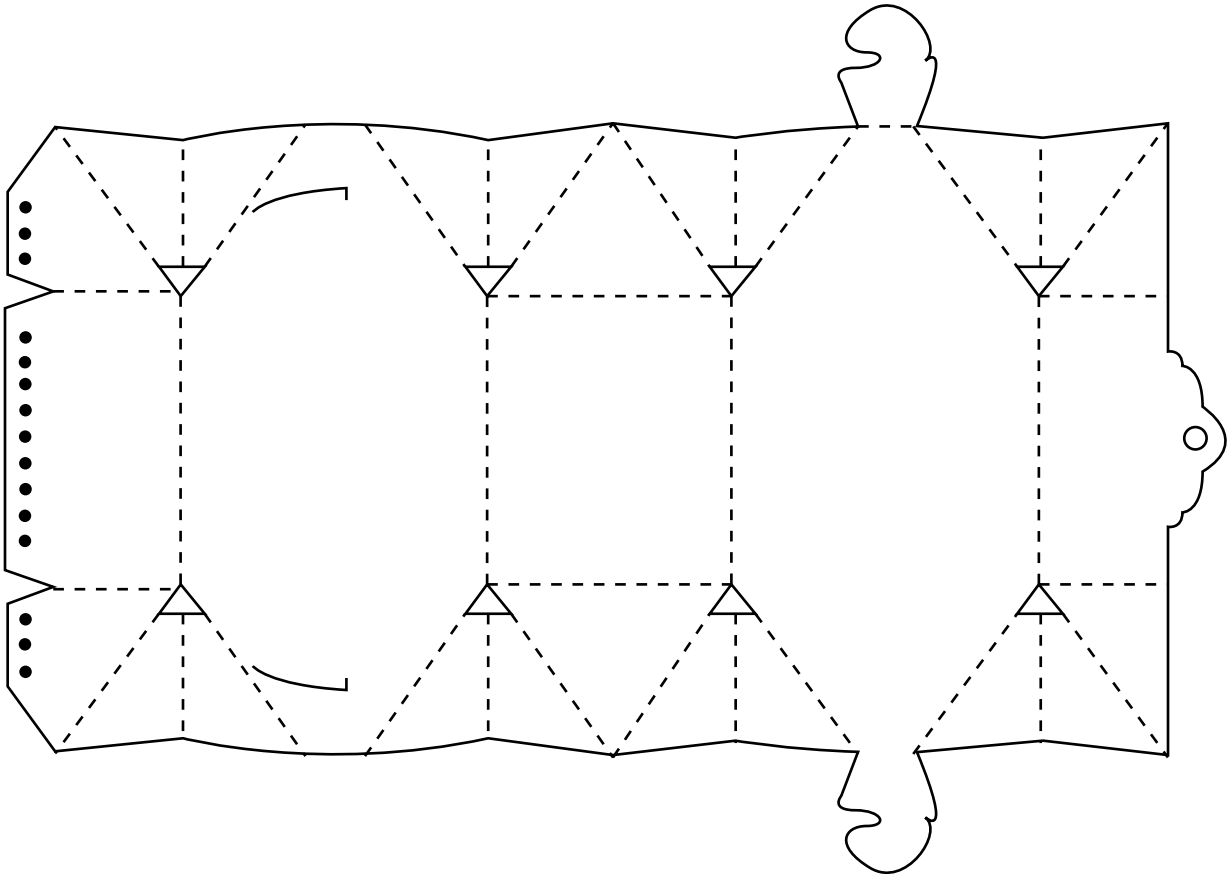
This exciting package uses an elasticized string as a closing device.

FIVE-POINTED STAR WITH GUSSETS

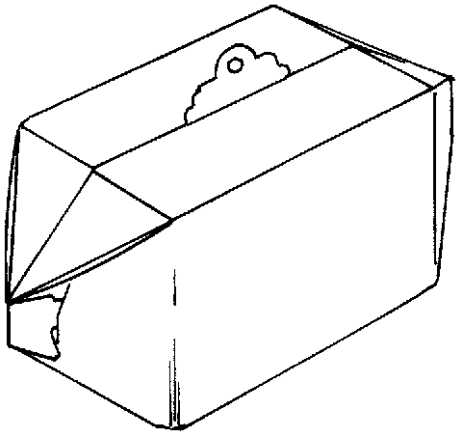


This beautiful candy package could be used as holiday ornament.

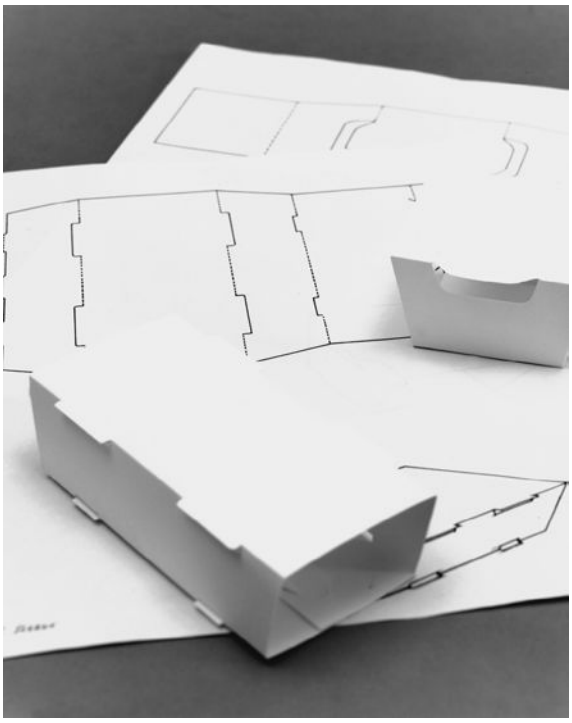




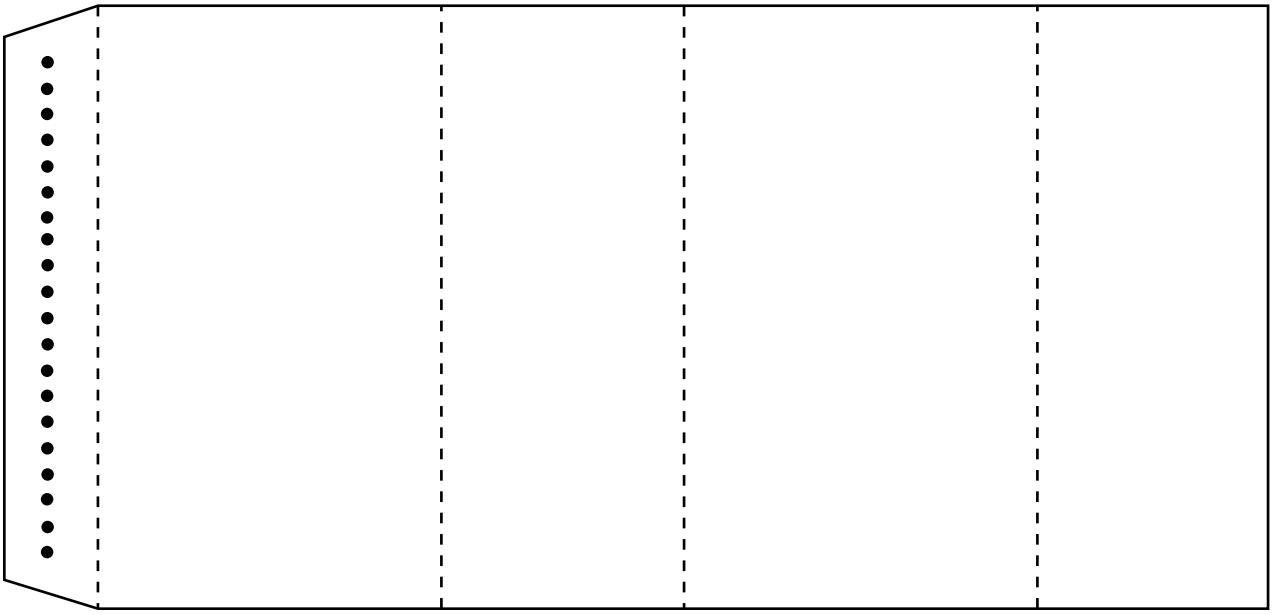
Designed by David James & Associates, this tea package lends itself to a variety of applications.

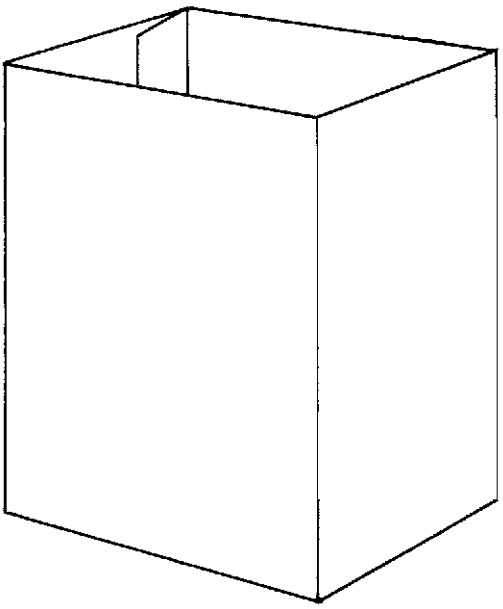


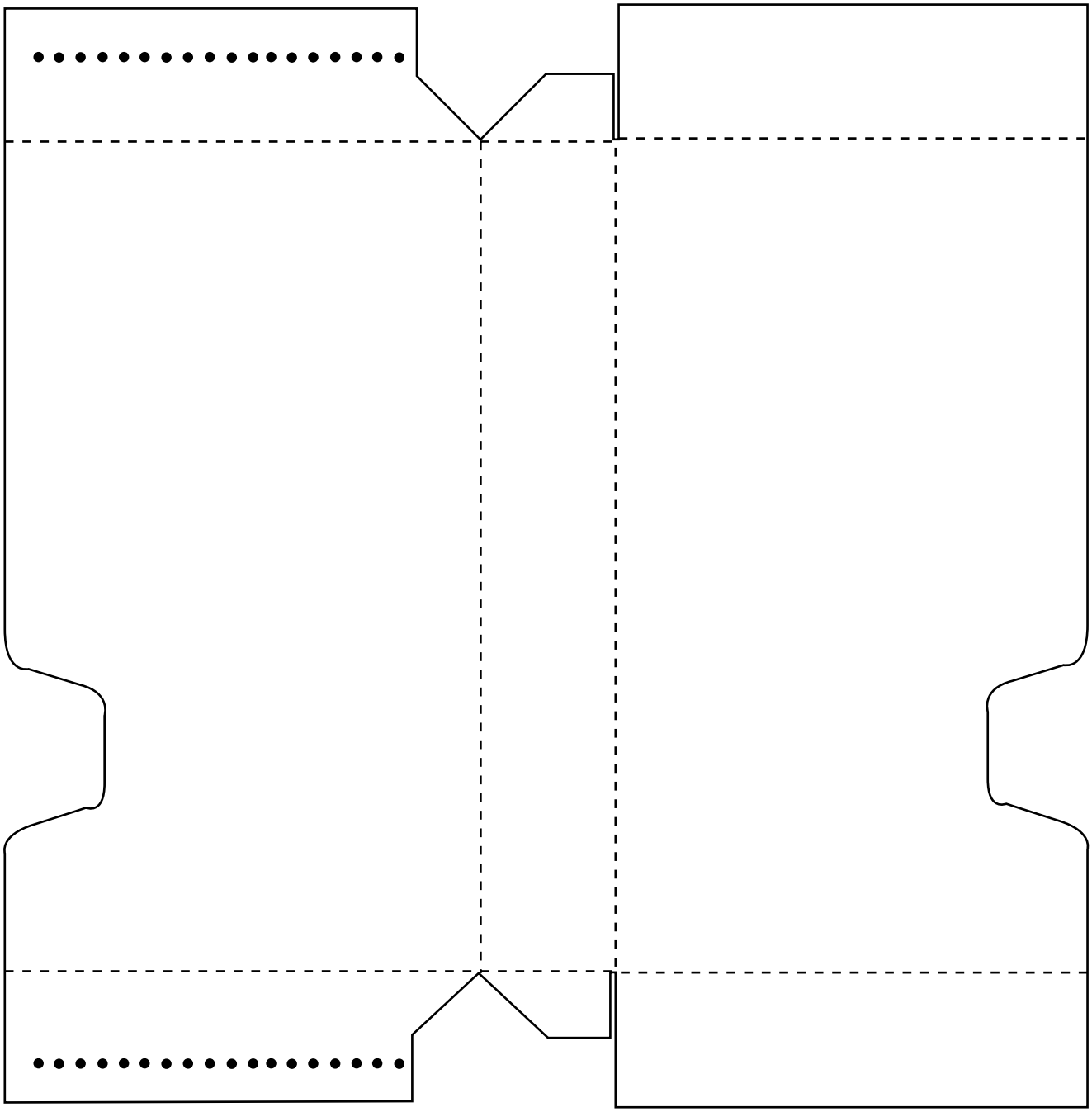
Sleeves, Wraps, and Folders

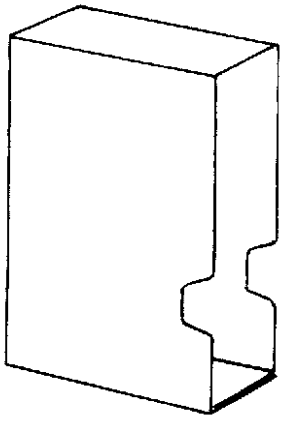


OPEN-END SIMPLE GLUED SLEEVE



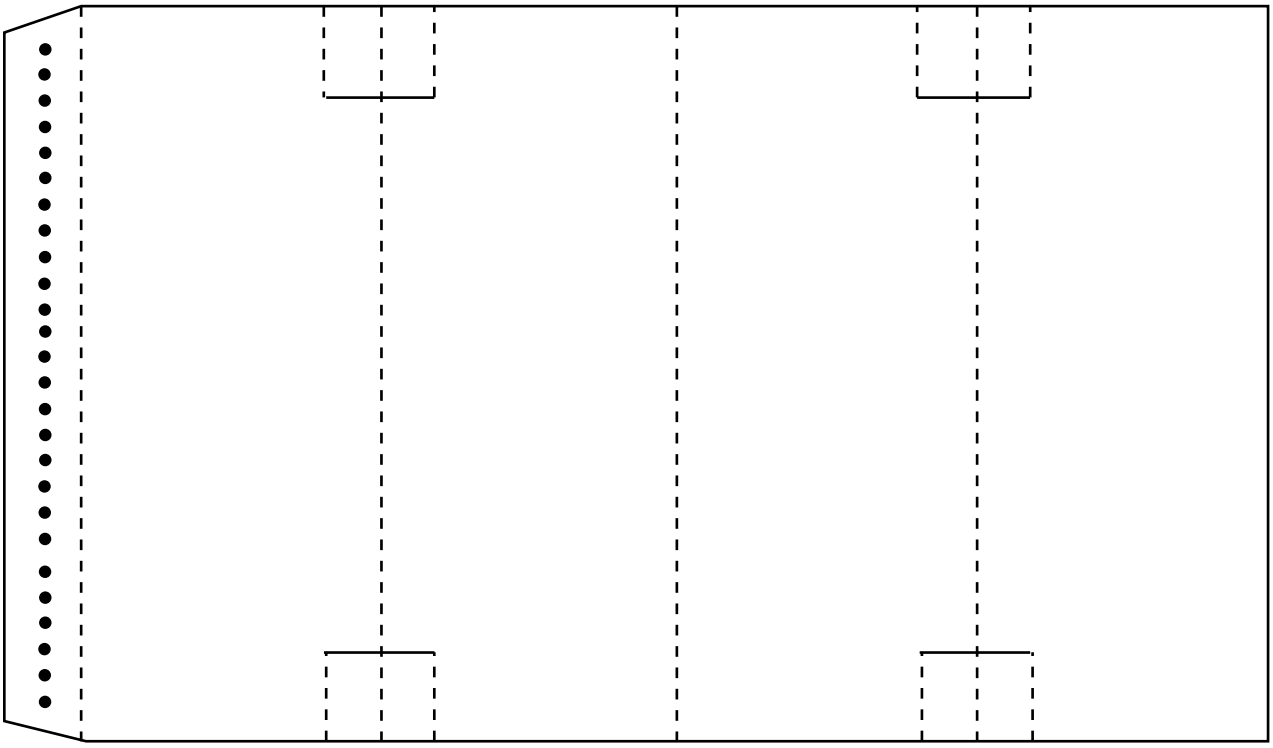


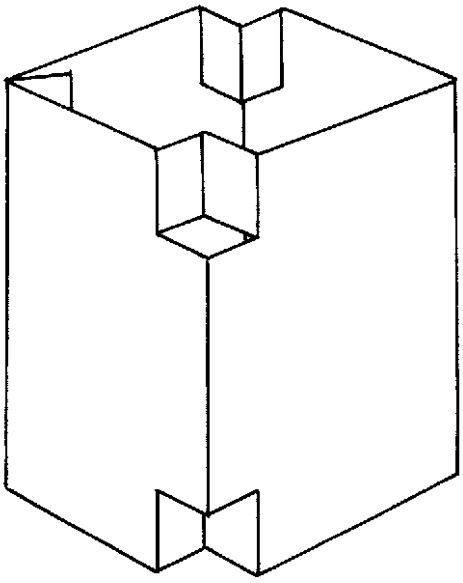


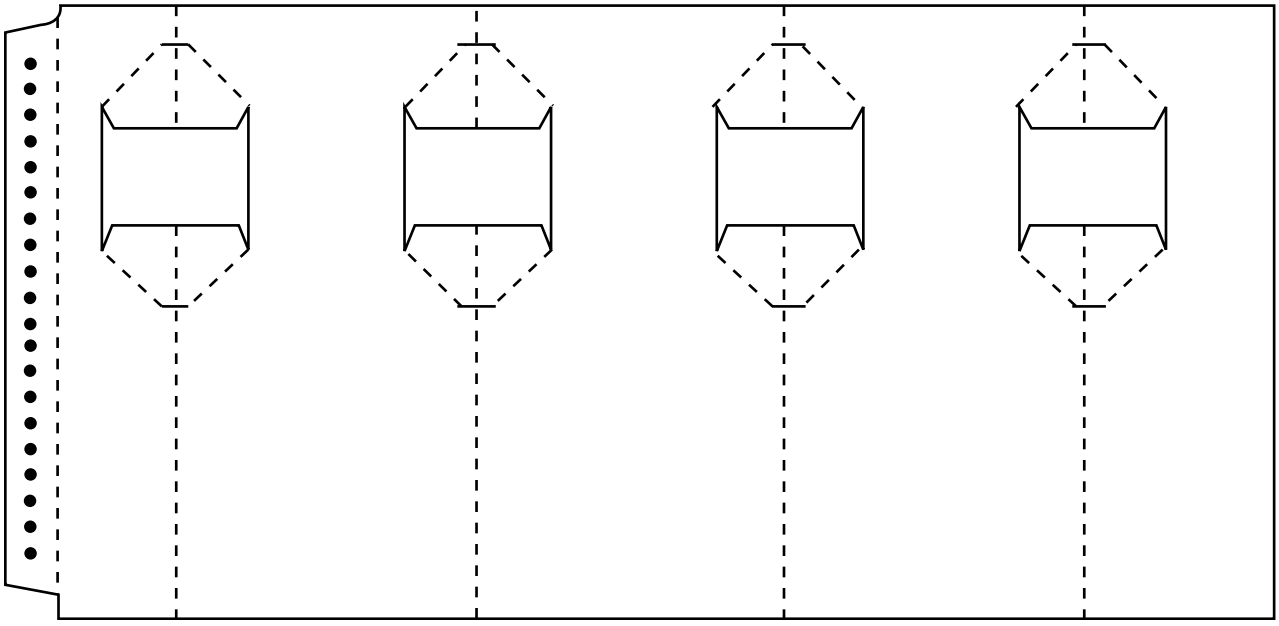


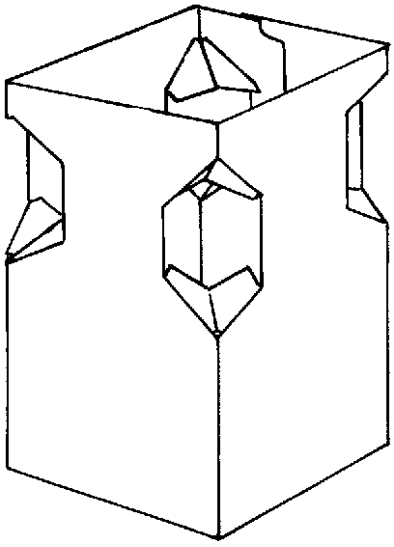
Typically used for videotape cassettes.

OPEN-END SLEEVE WITH RECESSED PRODUCT RETAINERS



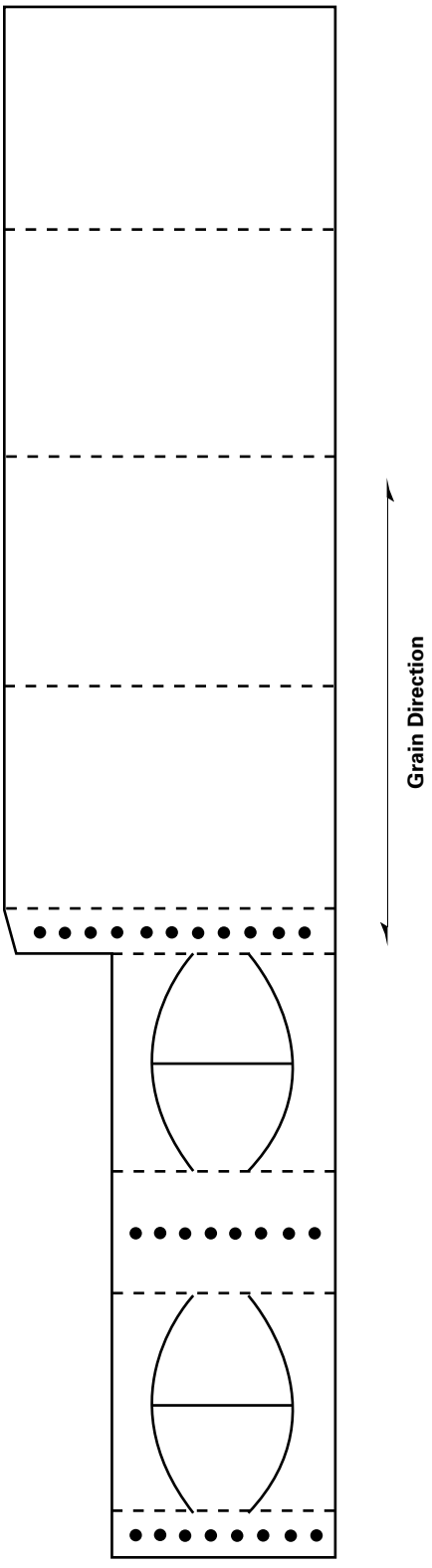




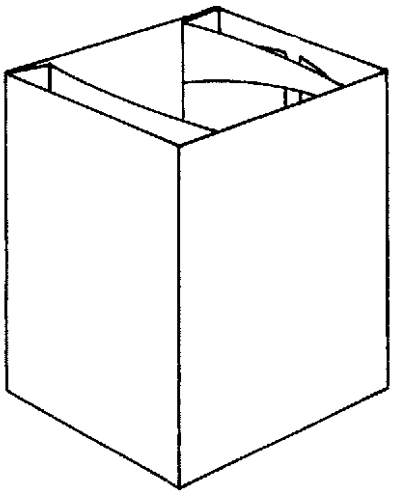


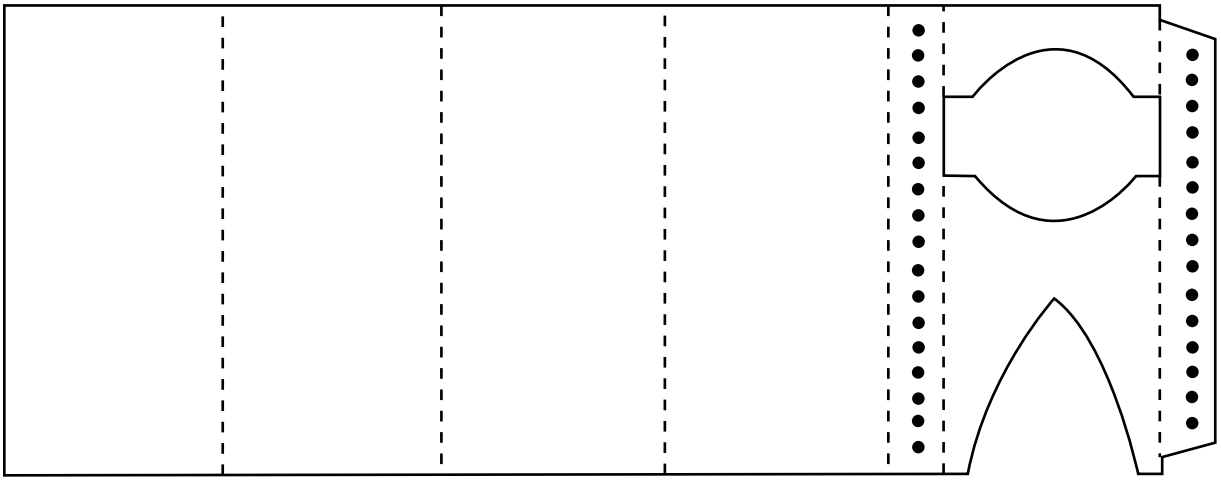
Typical contruction for a fragile product (e.g., light bulbs). *(PAT. #3,082,931)*

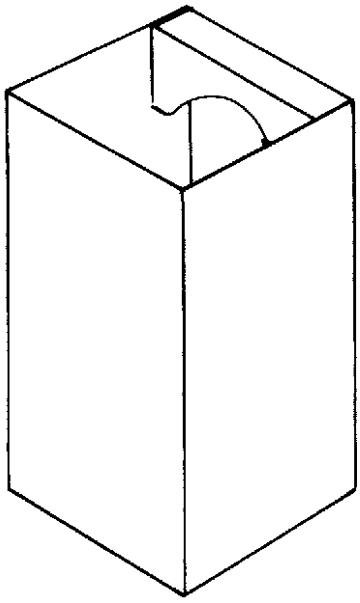
LIGHT-BULB SLEEVE



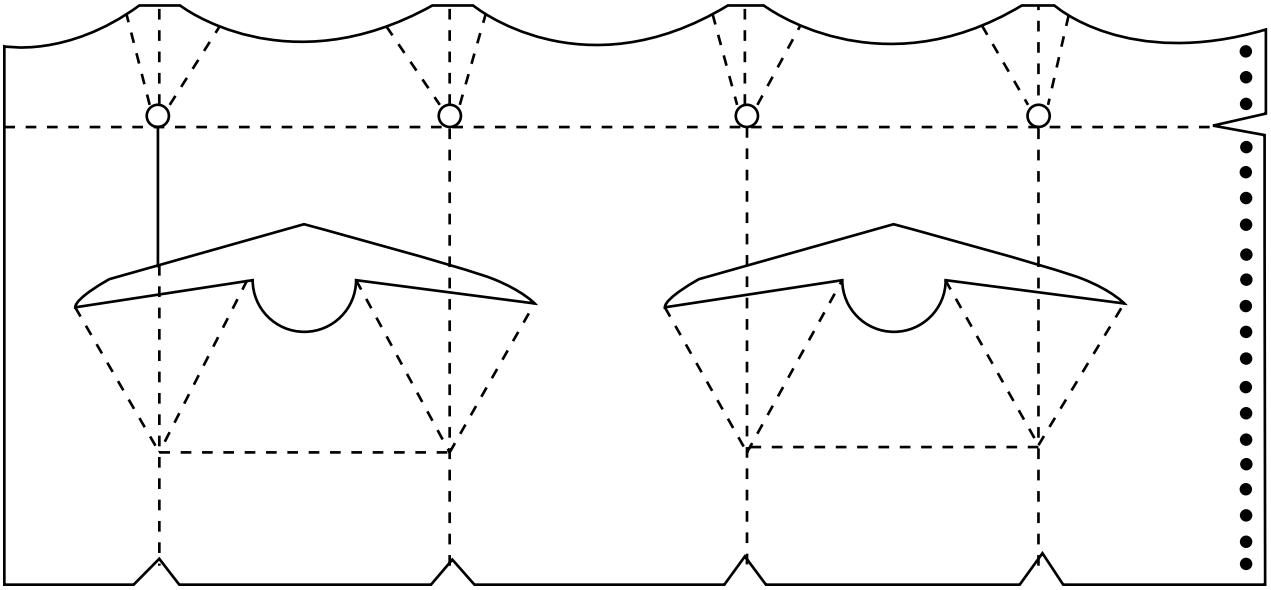
The tension of the inner panel die-cuts help keep the product in place.



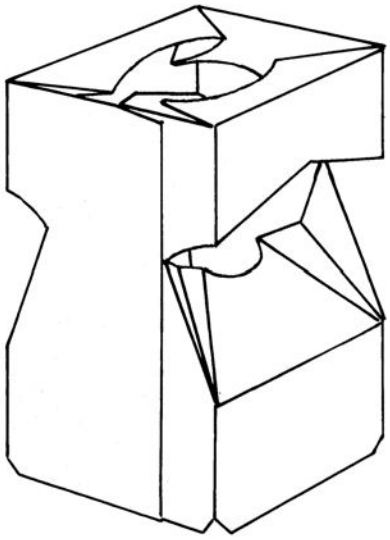


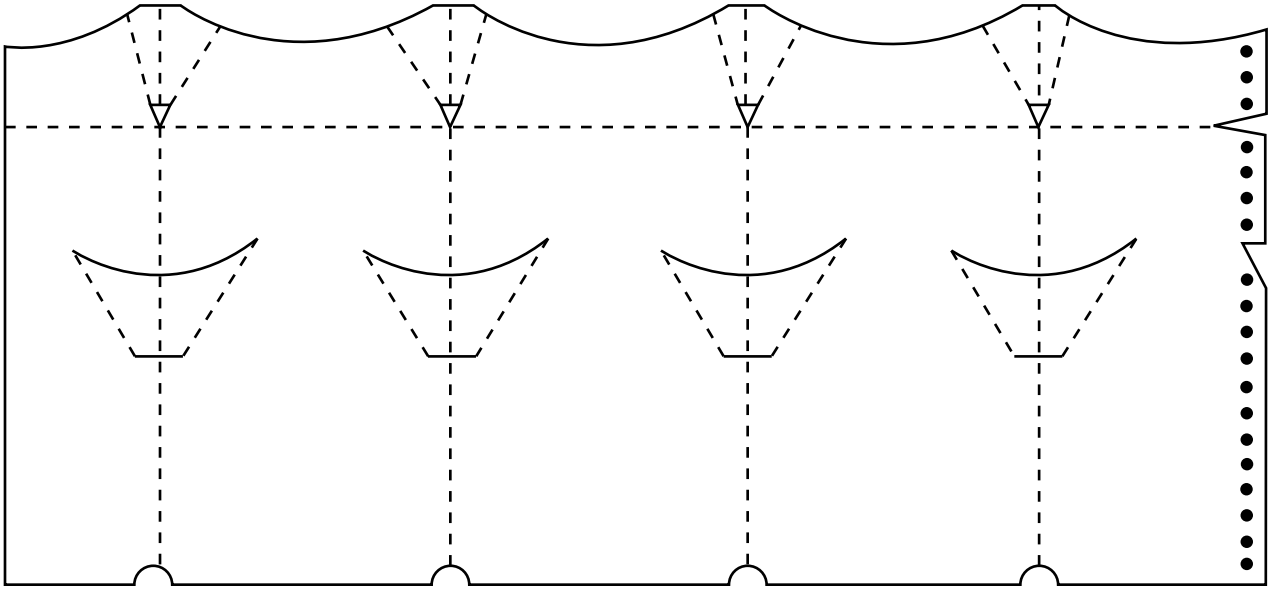


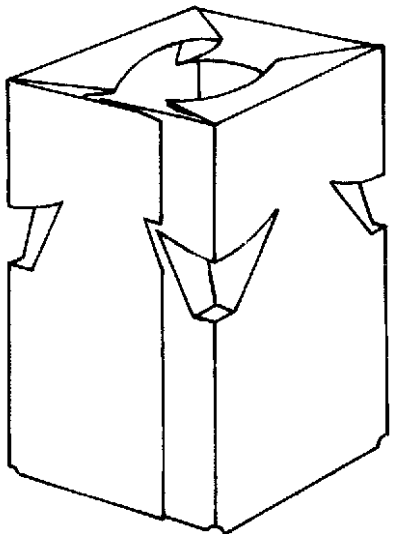
LIGHT-BULB SLEEVE WITH SCORED INFOLDS AND PARTIAL COVER

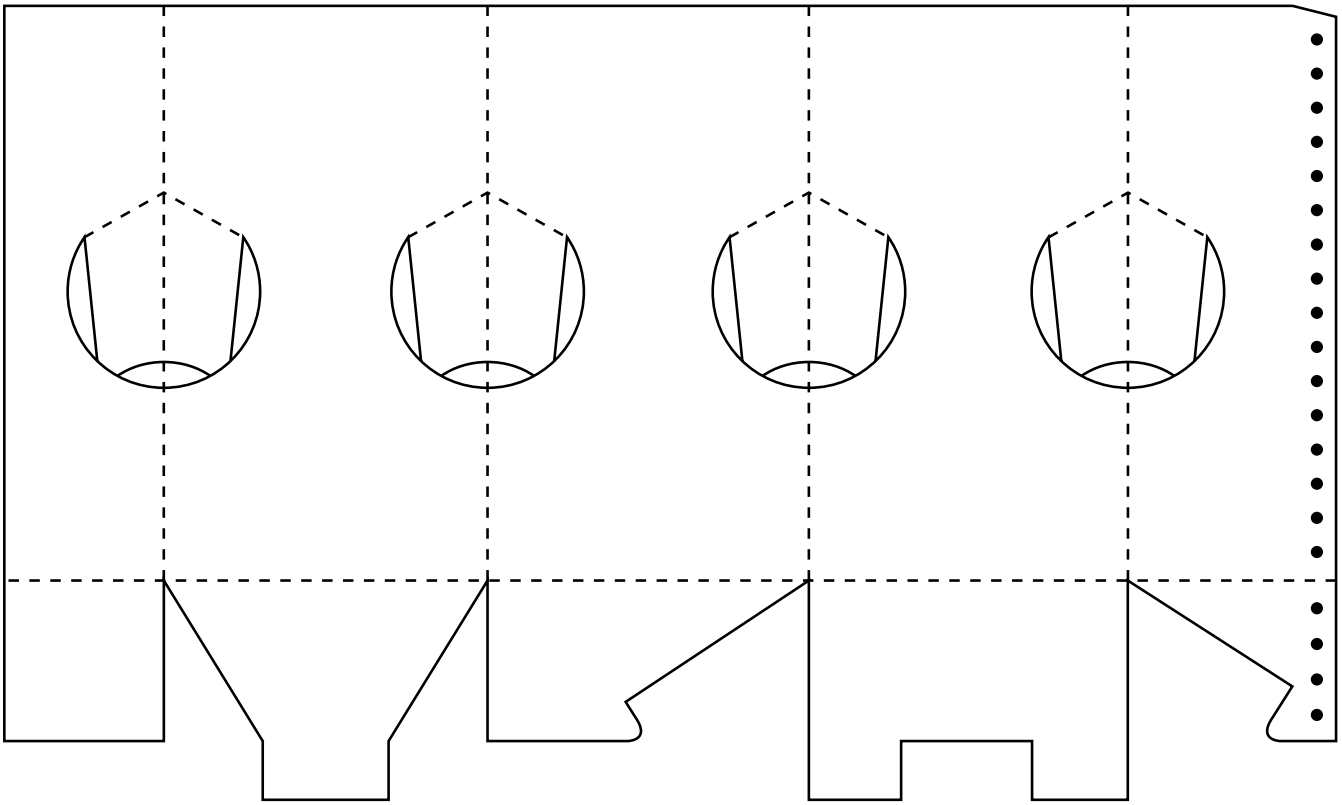


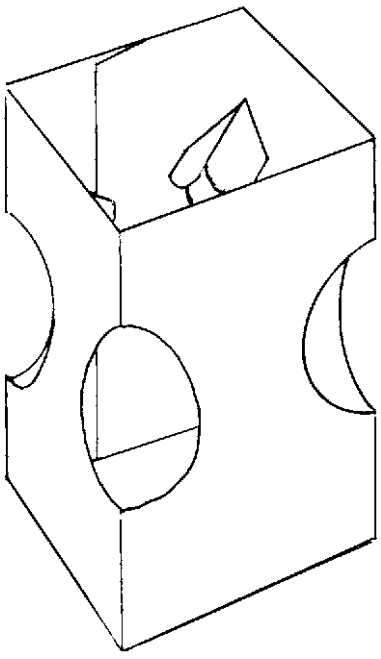
Both the cover and the infolds may be constructed to fit any product.

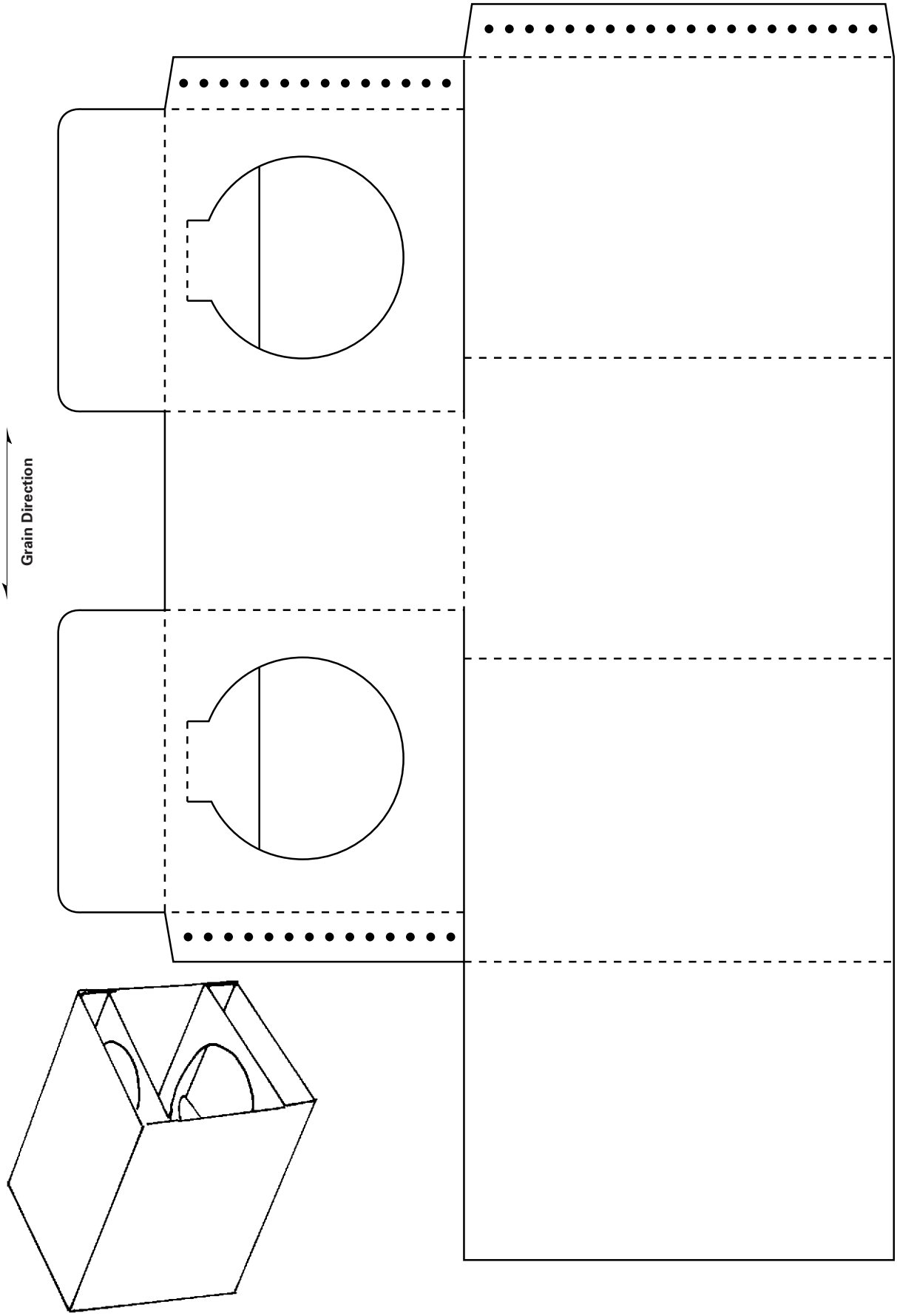


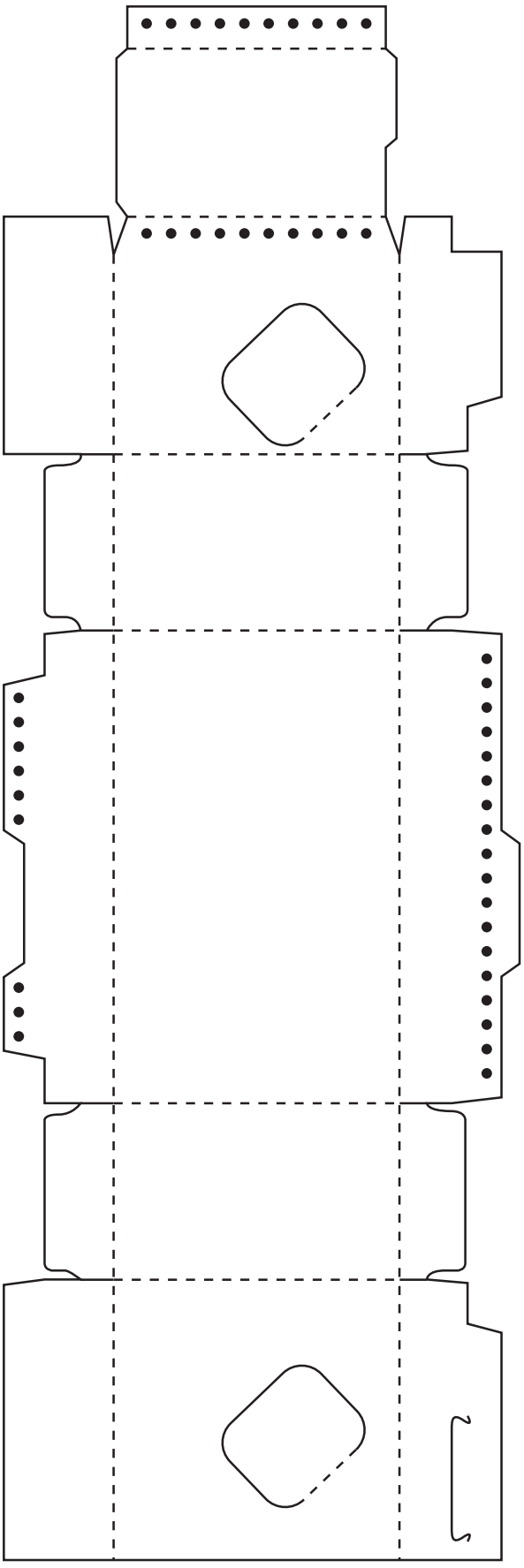




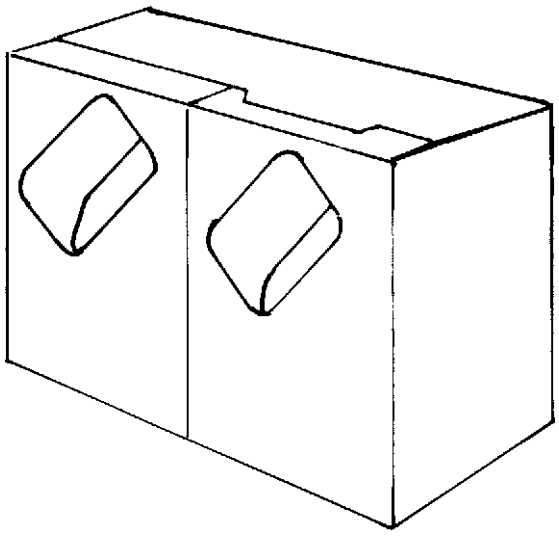


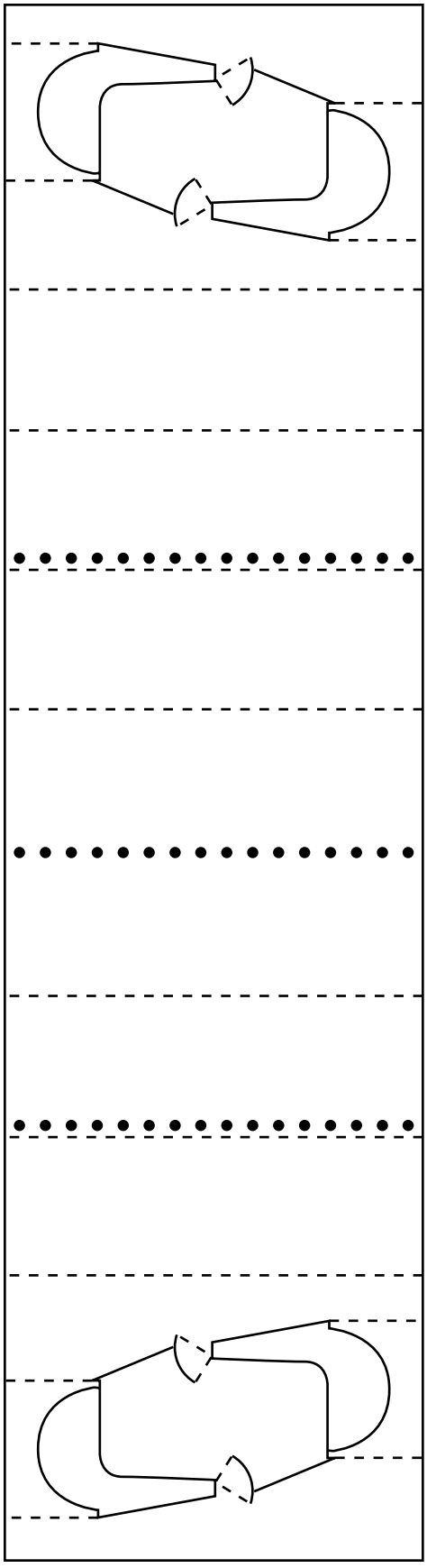


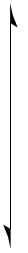

Grain Direction

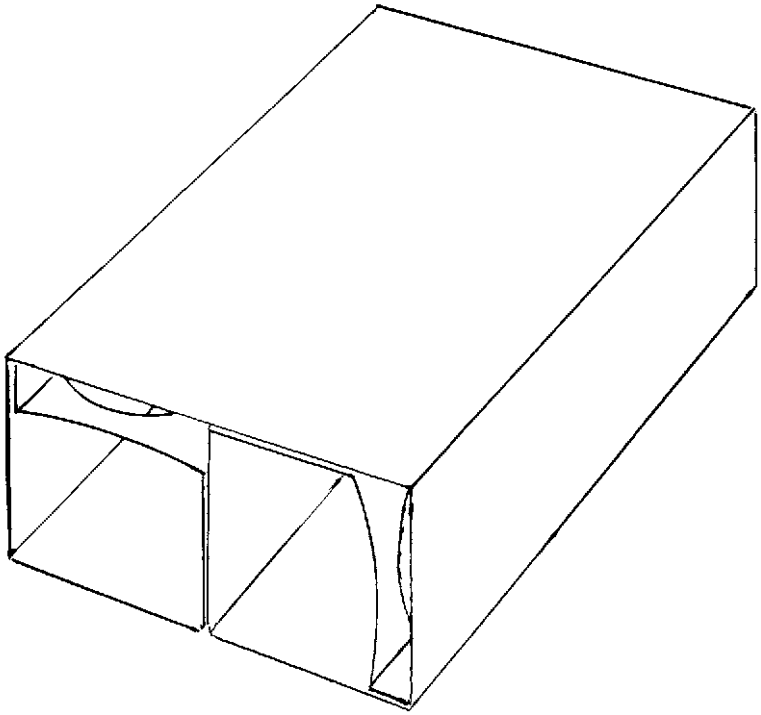


The die-cut windows folded into the package act as separators.



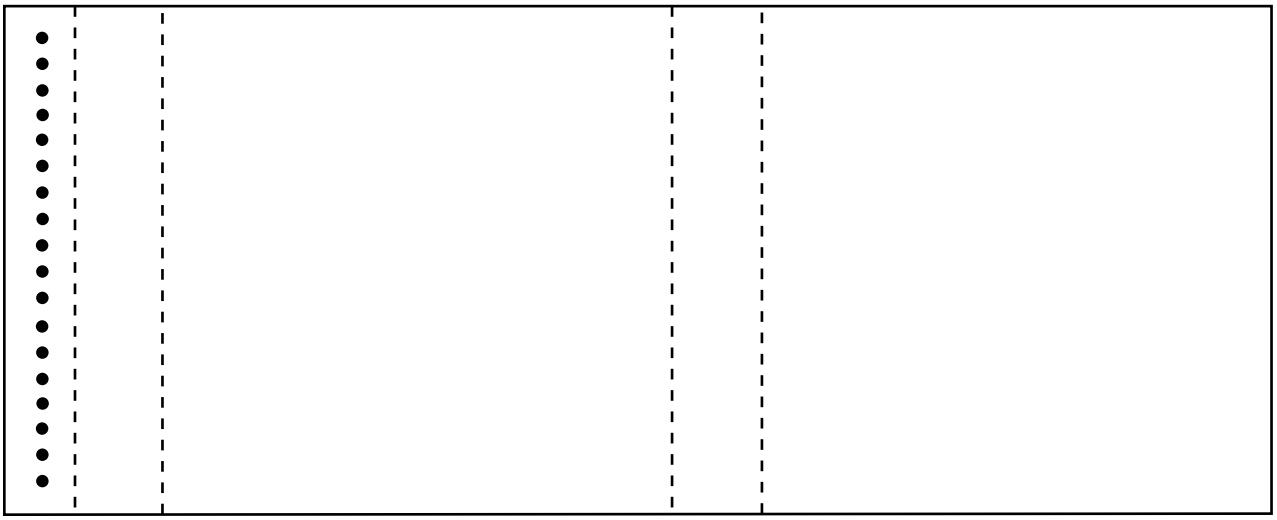


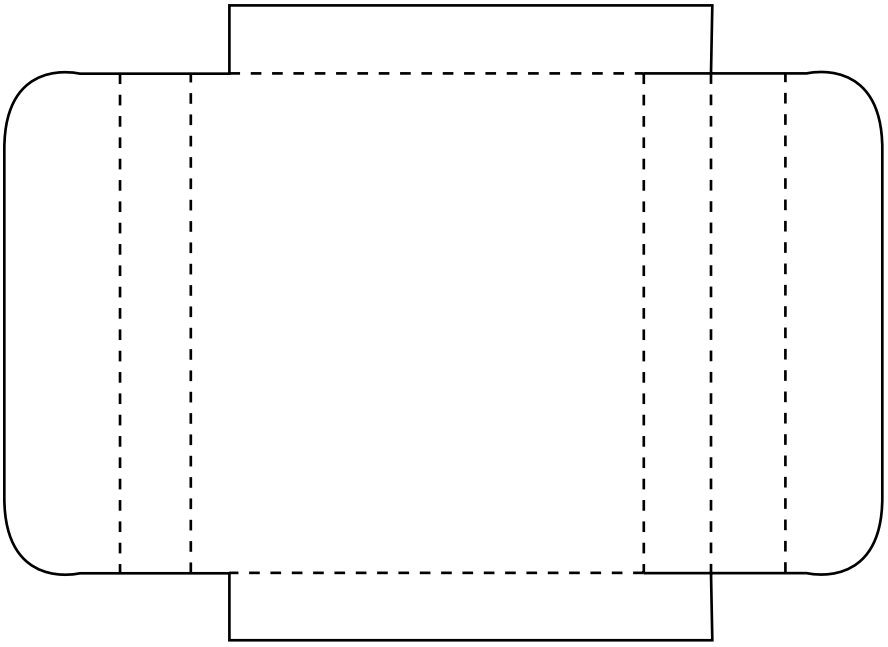


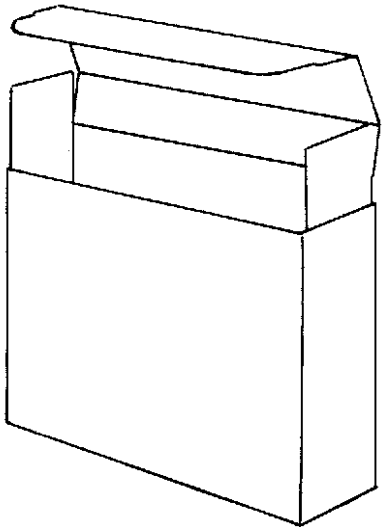


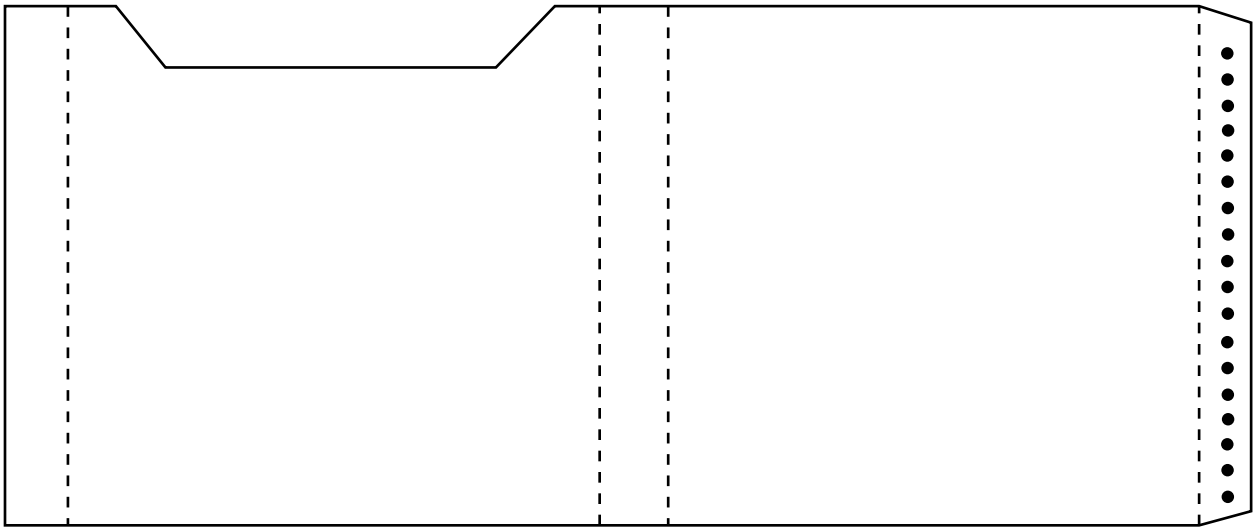
The swiveling panels at each end panel help to lock as well as protect the fragile glass bulbs.

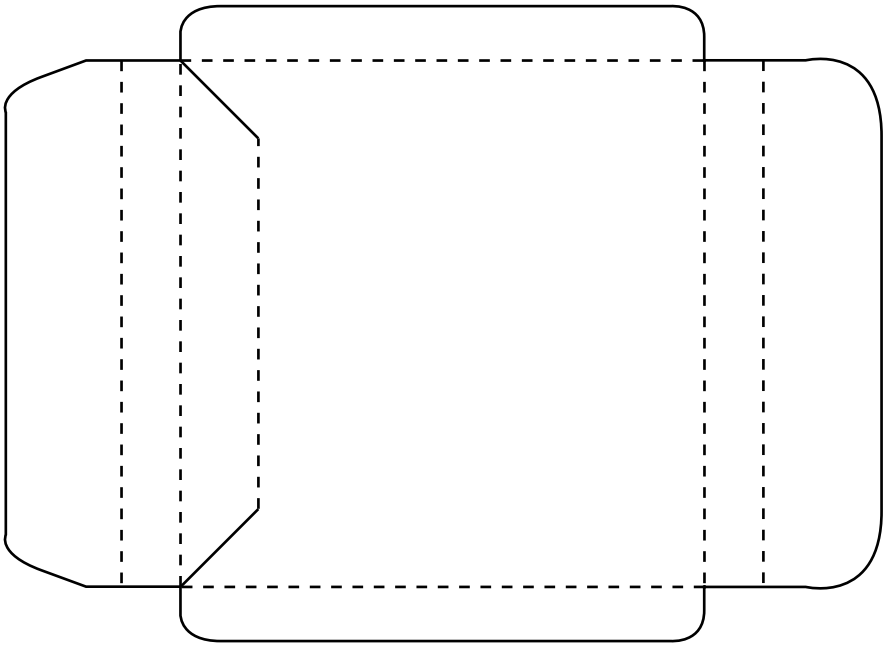
TWO-PIECE DISPENSER SLEEVE

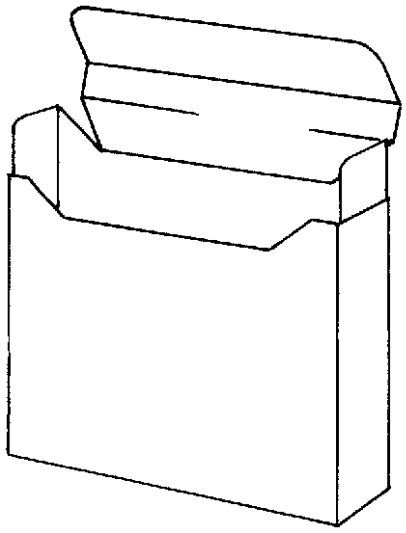




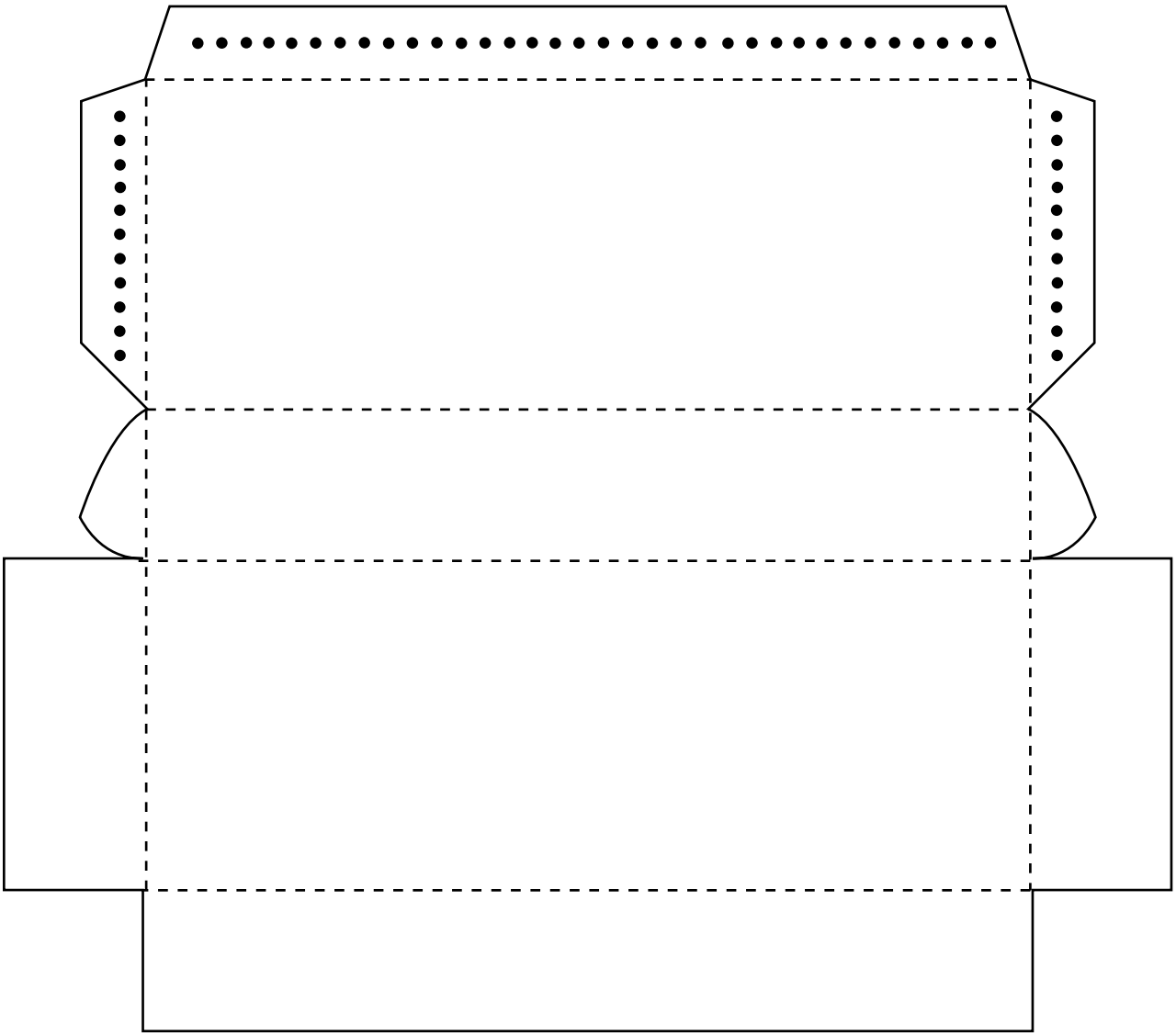


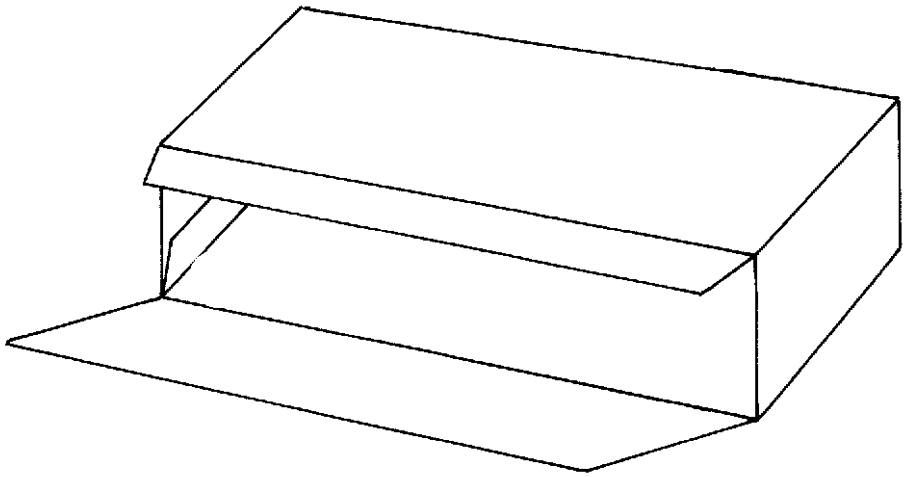


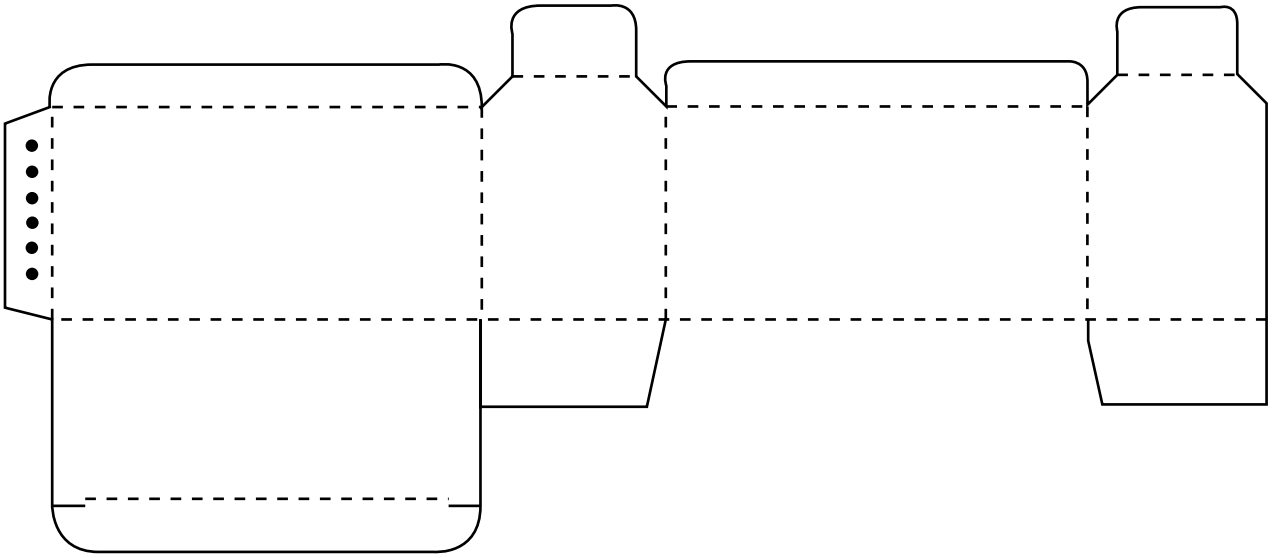


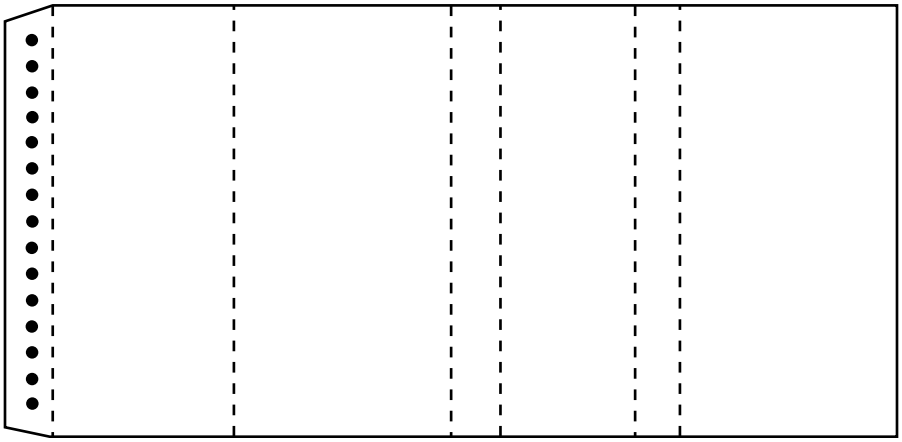


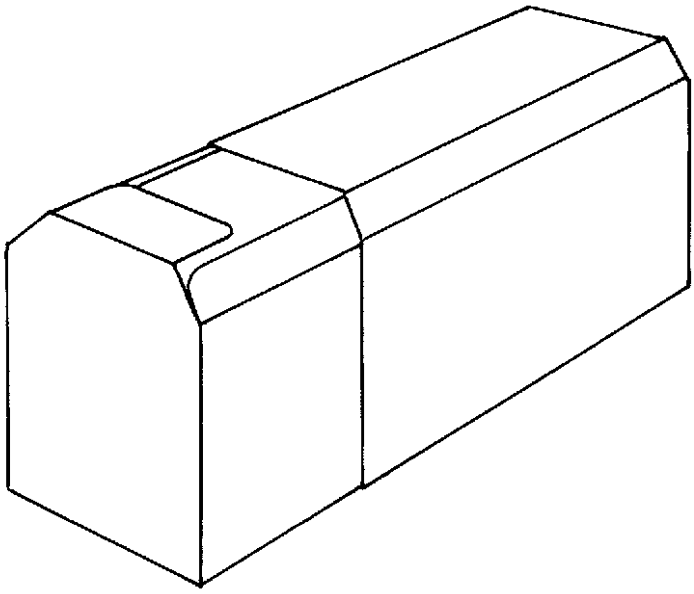
TYPICAL CIGARETTE SLEEVE



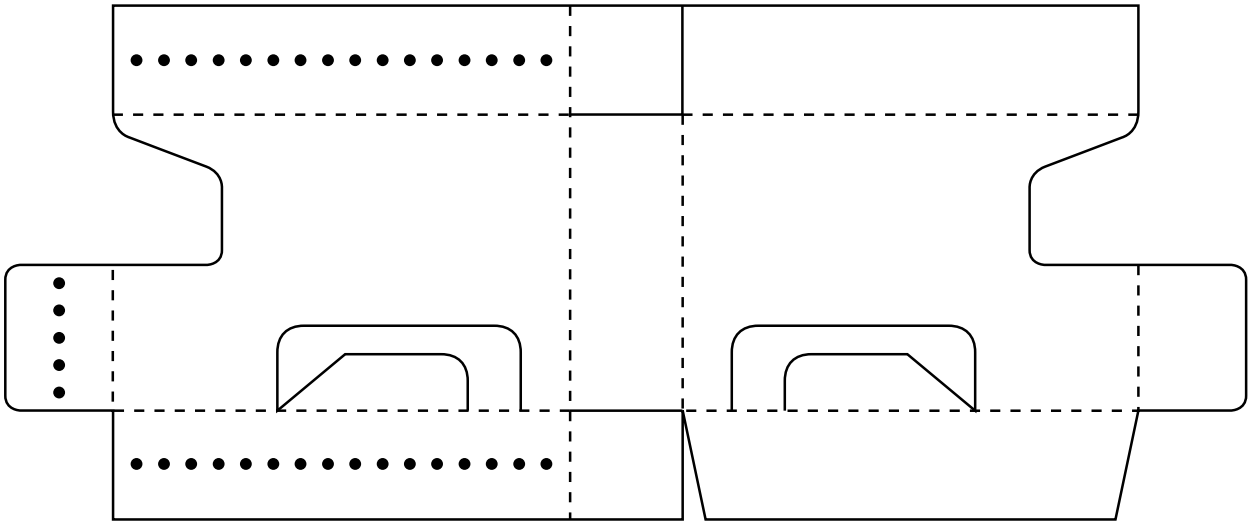


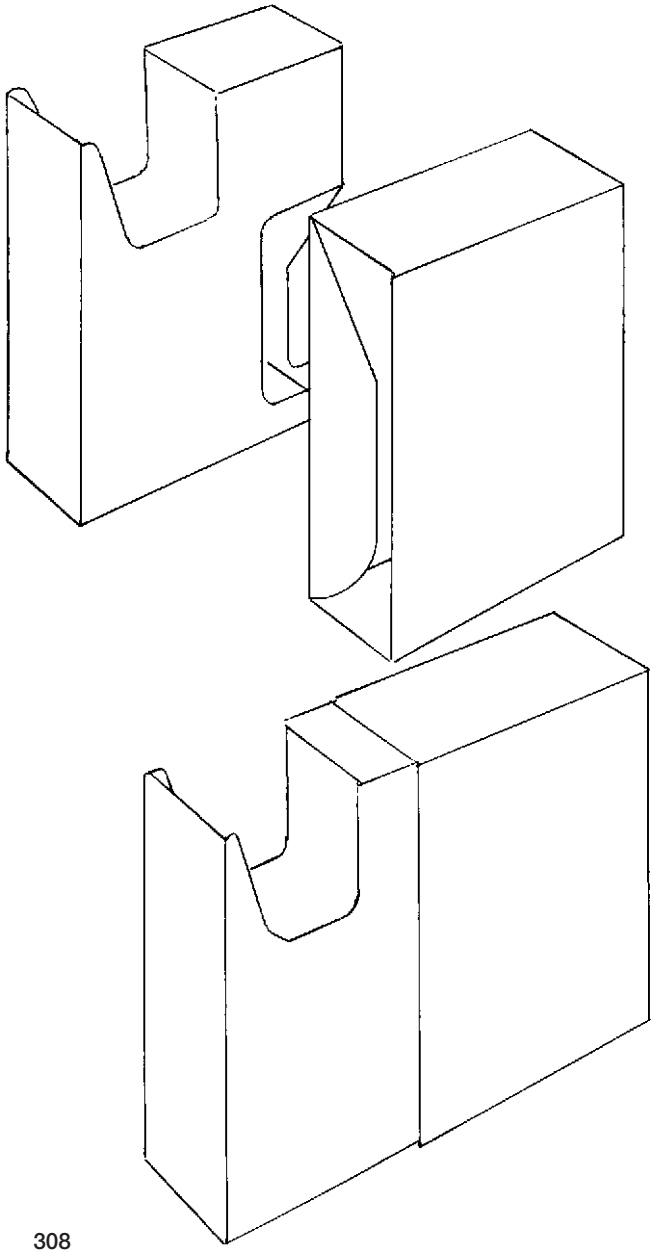


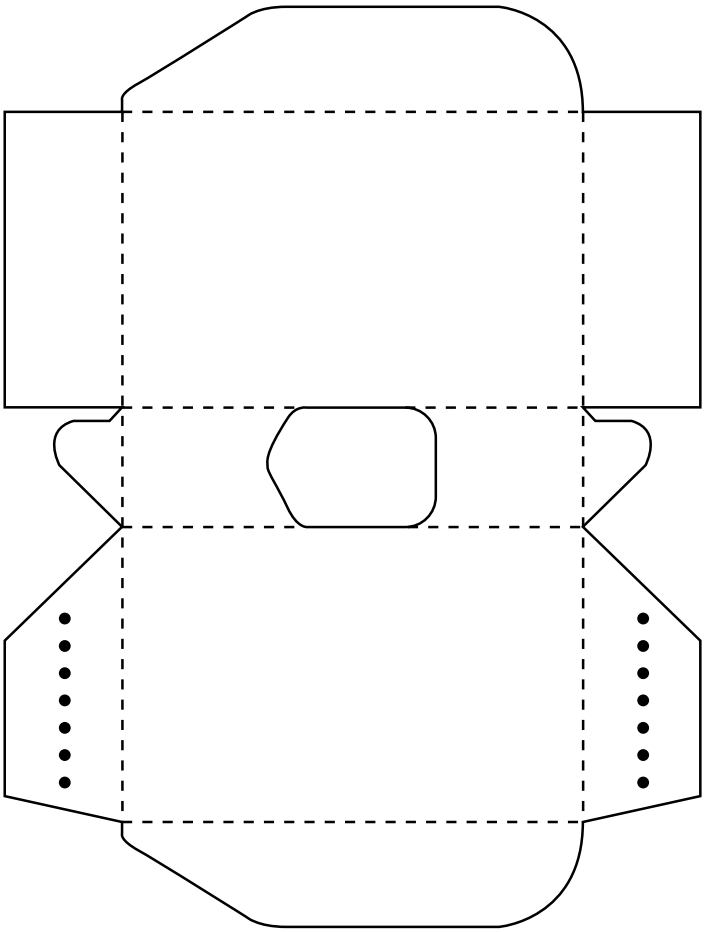


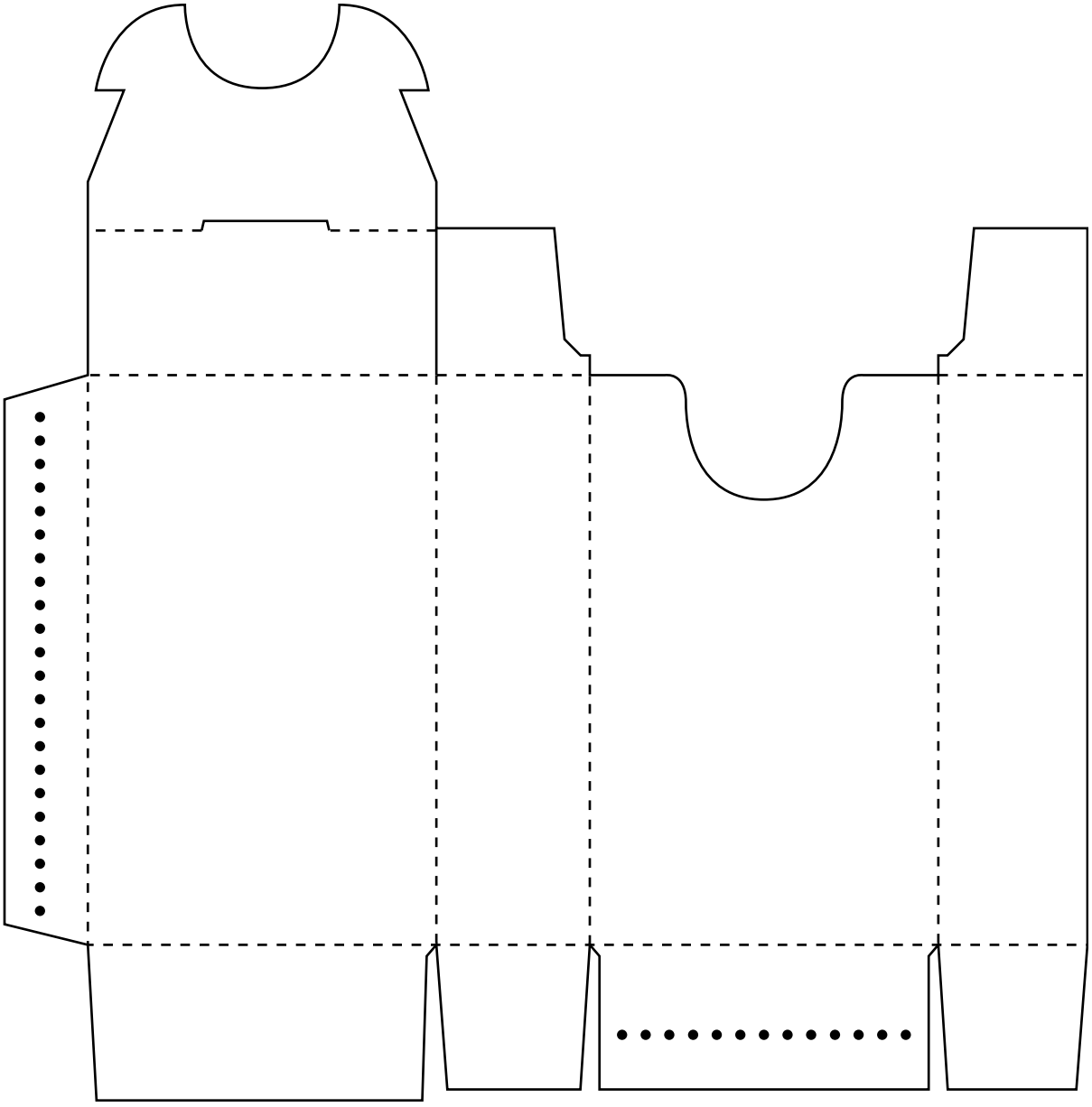


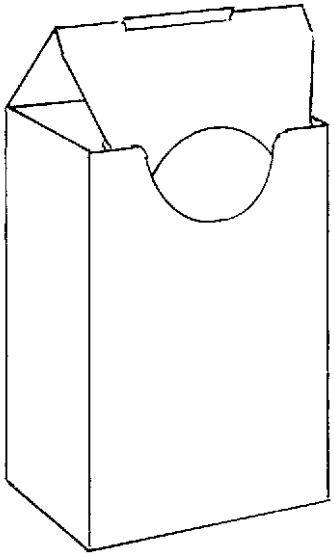
TWO-PIECE SLIDE DISPENSER





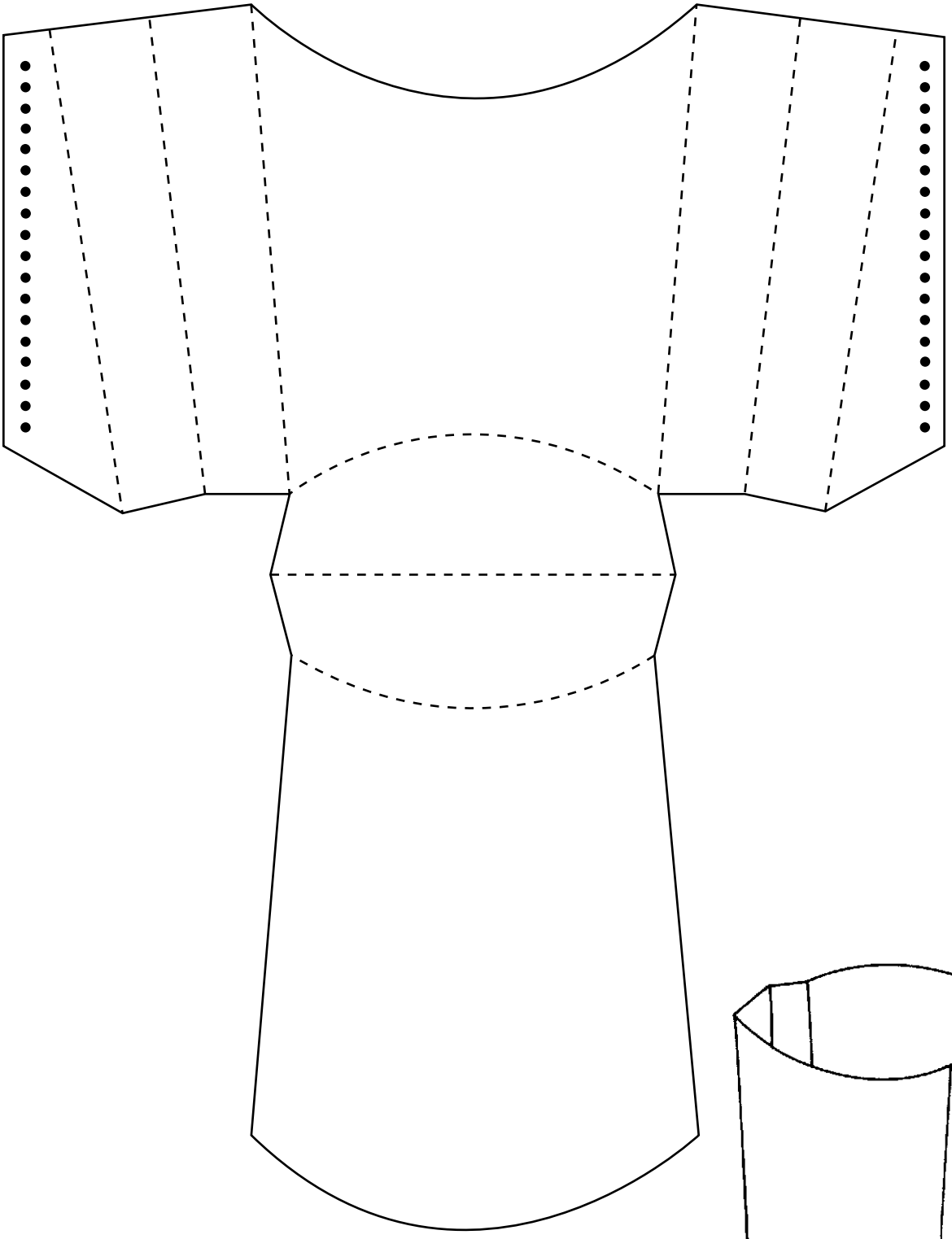


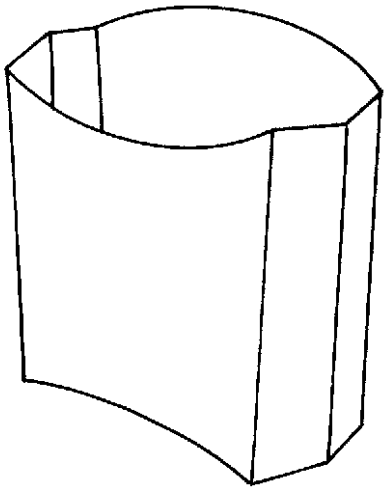




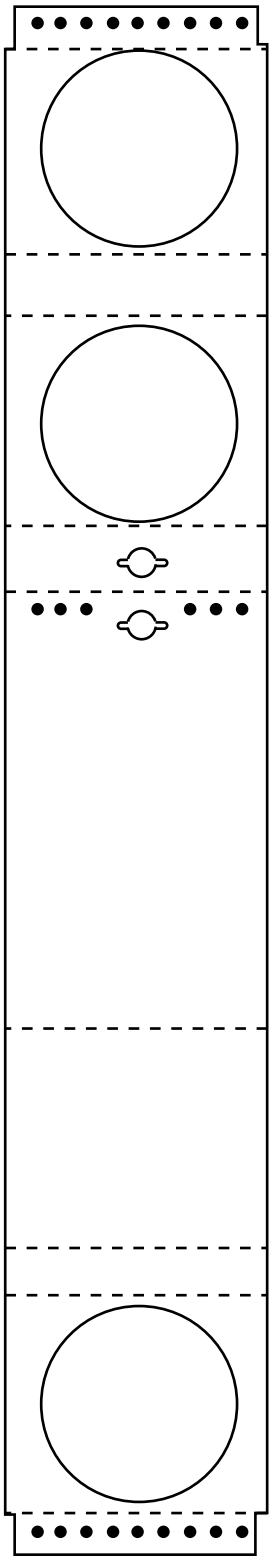
Patent #5505 373

CONTAINER SLEEVE FOR FRENCH-FRIED POTATOES

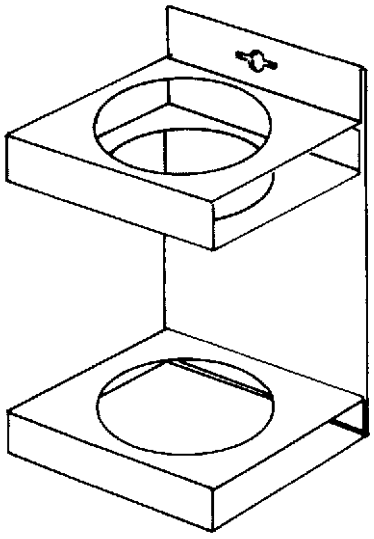




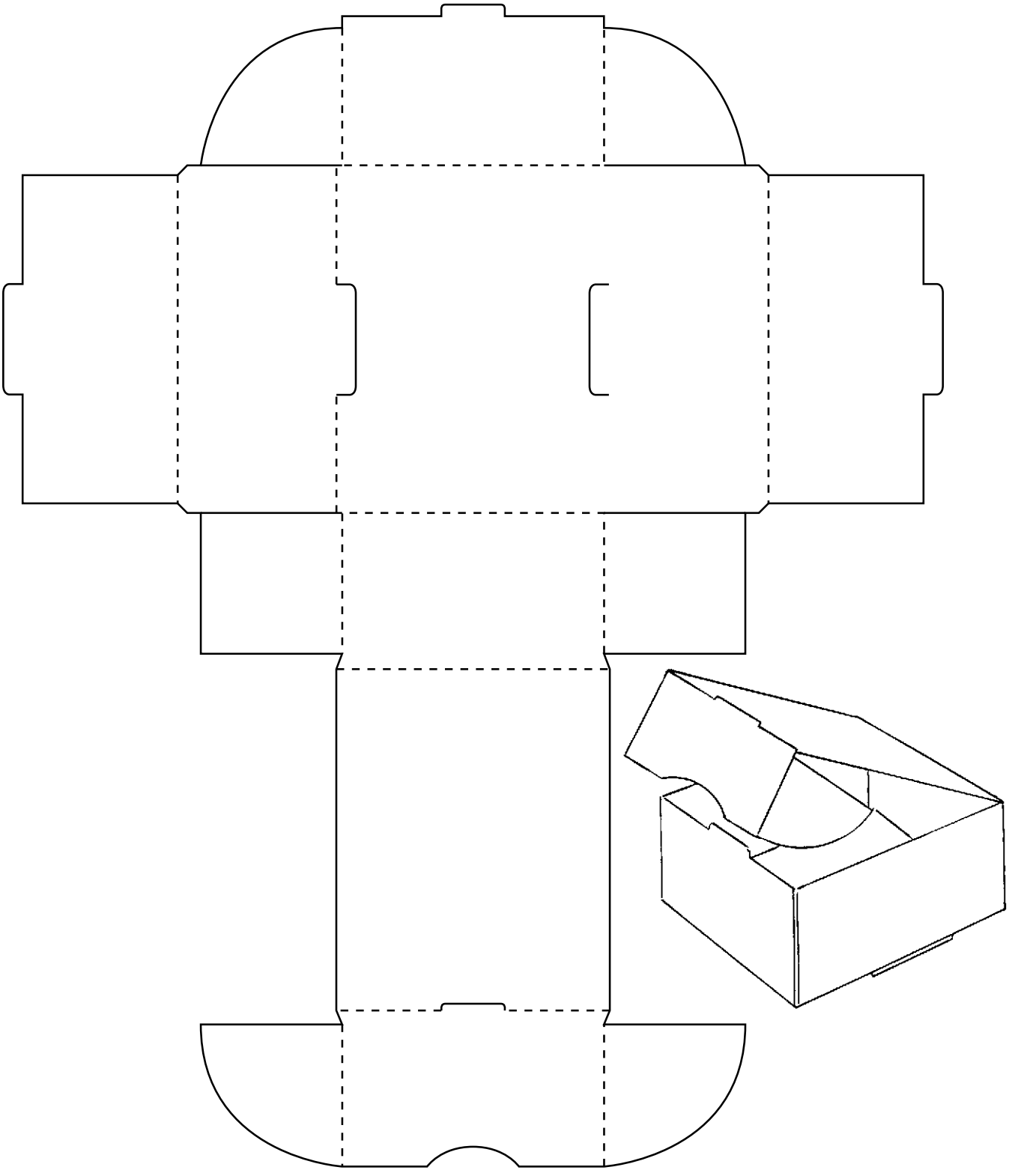
May be adapted for many other product uses.
(PAT. #3,630,430)



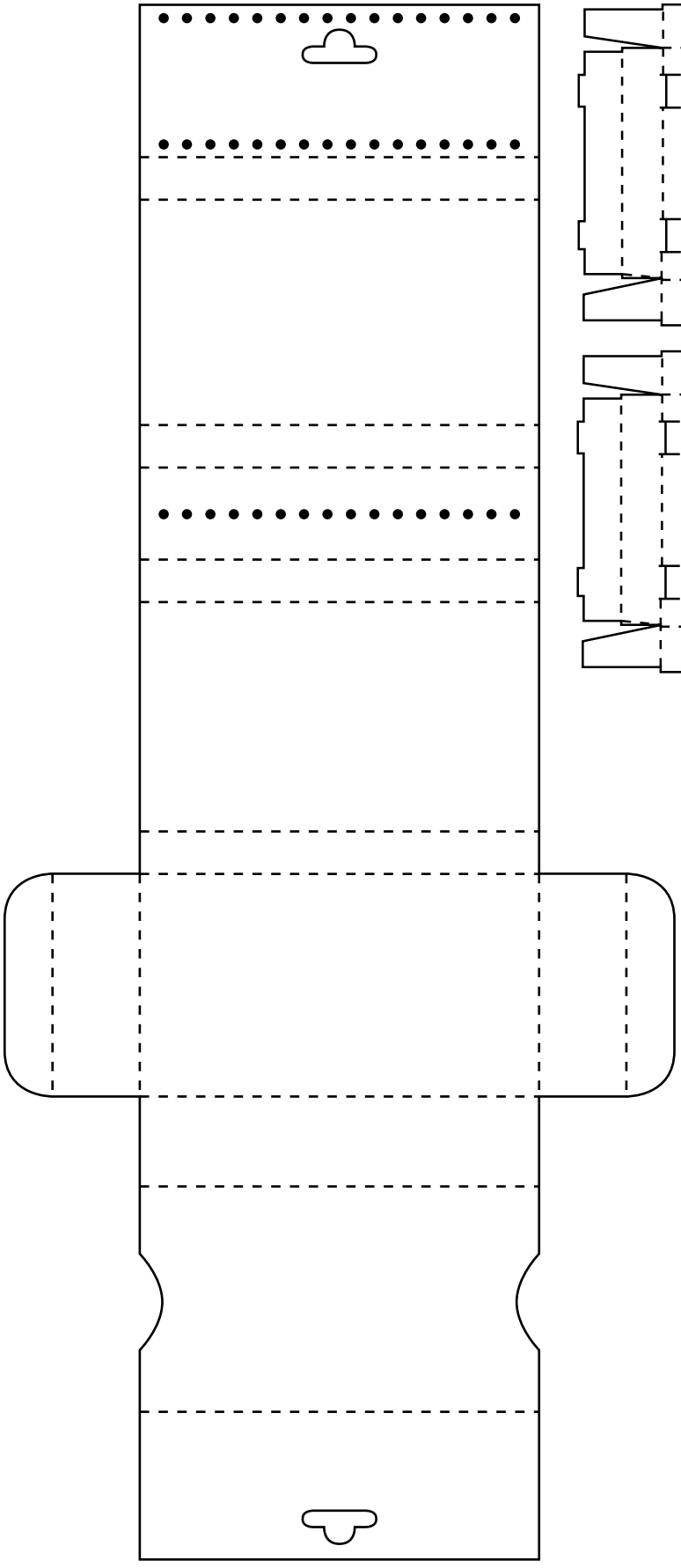
This one-piece construction lends itself to a large variety of lightweight product packaging with maximum product visibility.

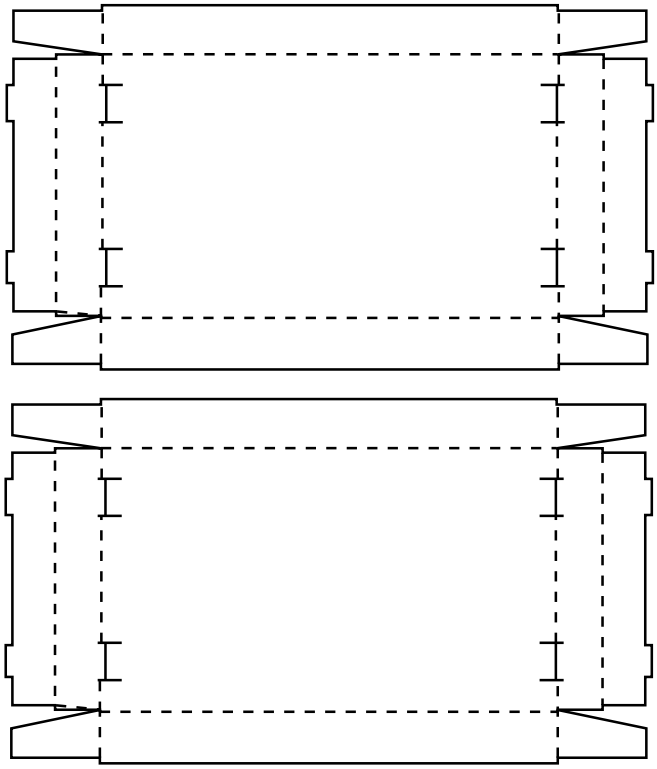


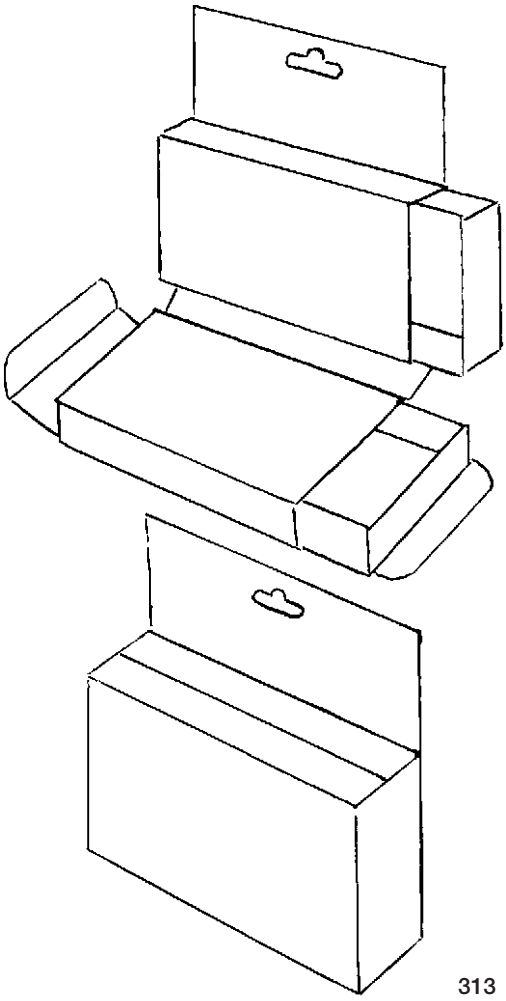
HARDWARE BOX



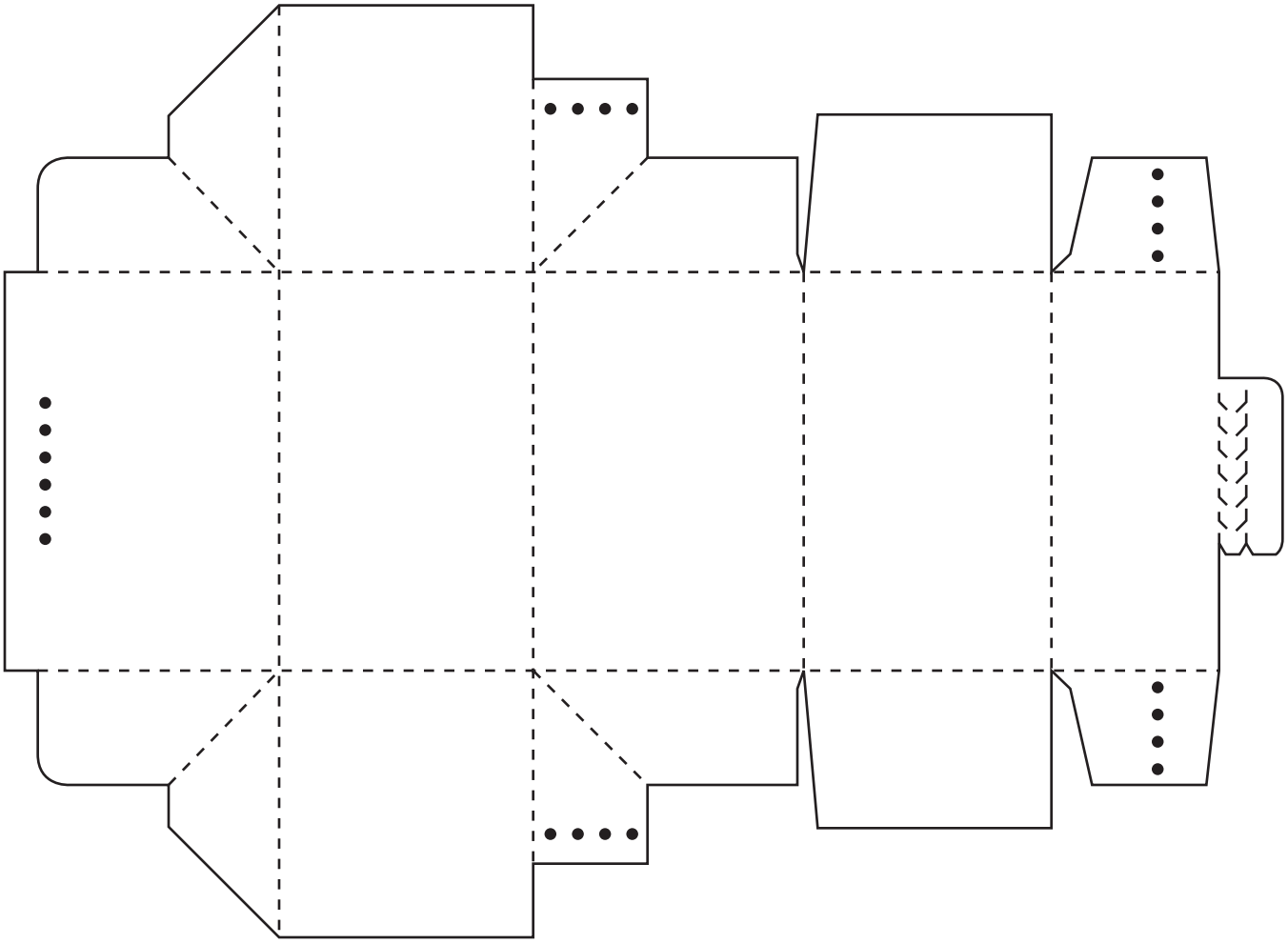
This double side wall/double end wall box is ideal for heavy hardware parts.

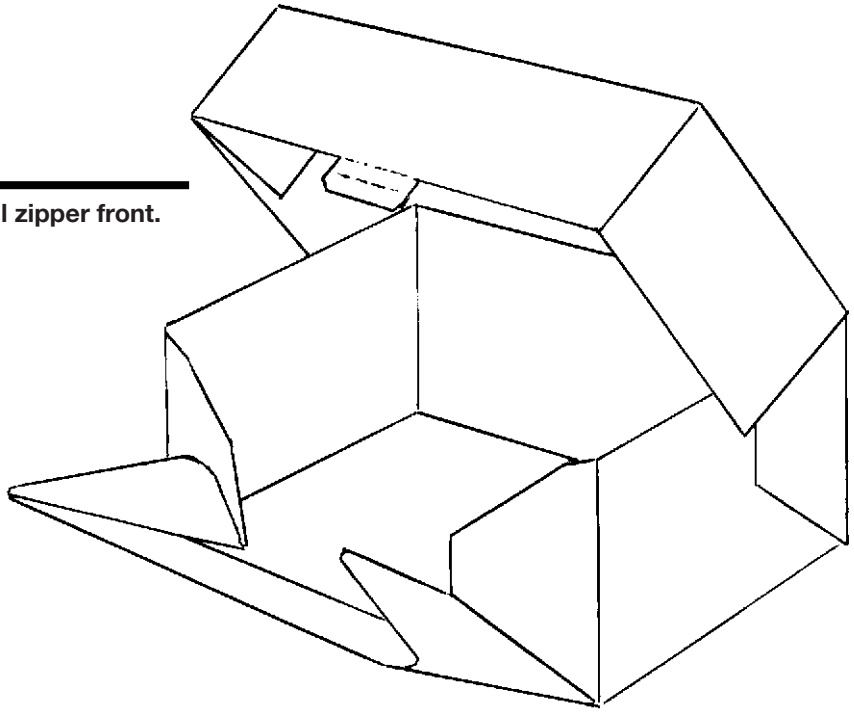




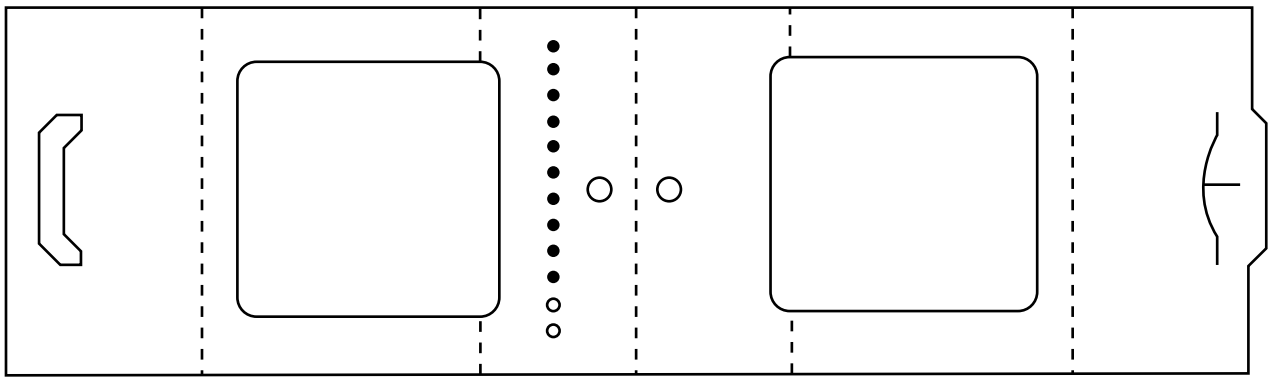


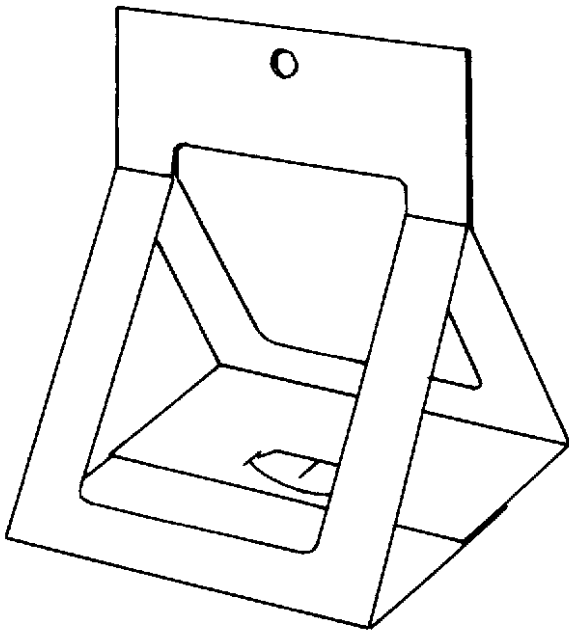
ZIPPER-SEALED WRAP



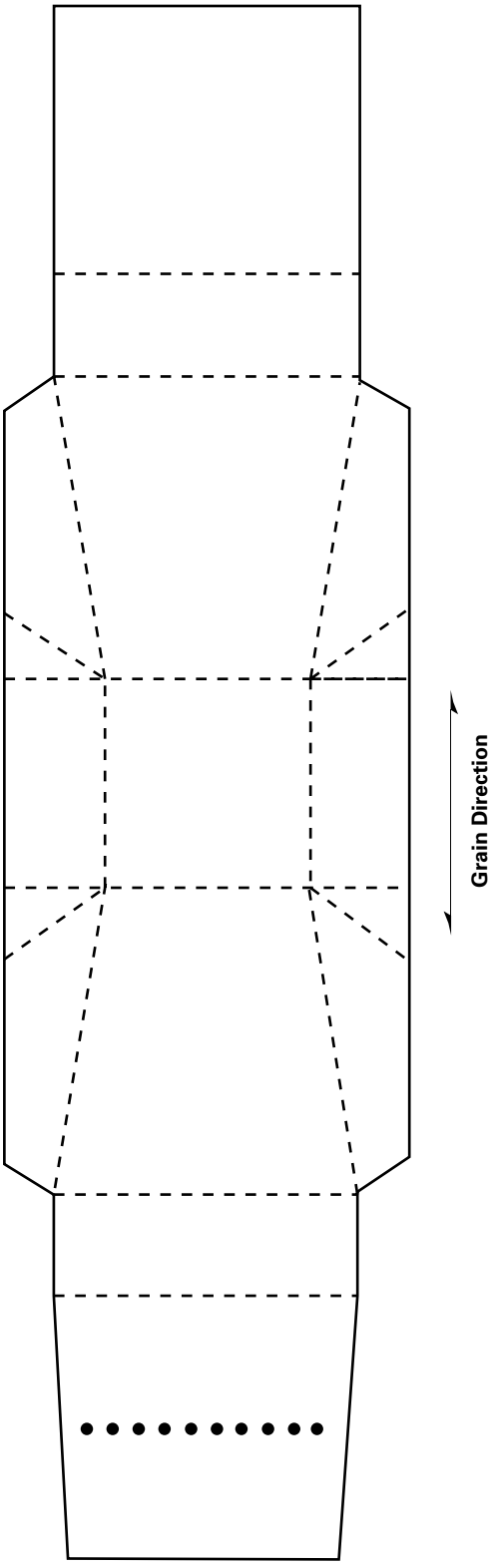


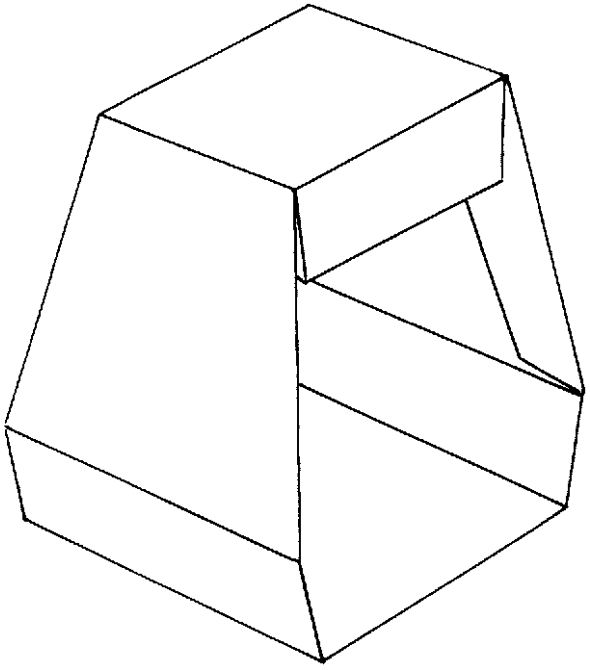
This accordion fold wrap has a small zipper front.

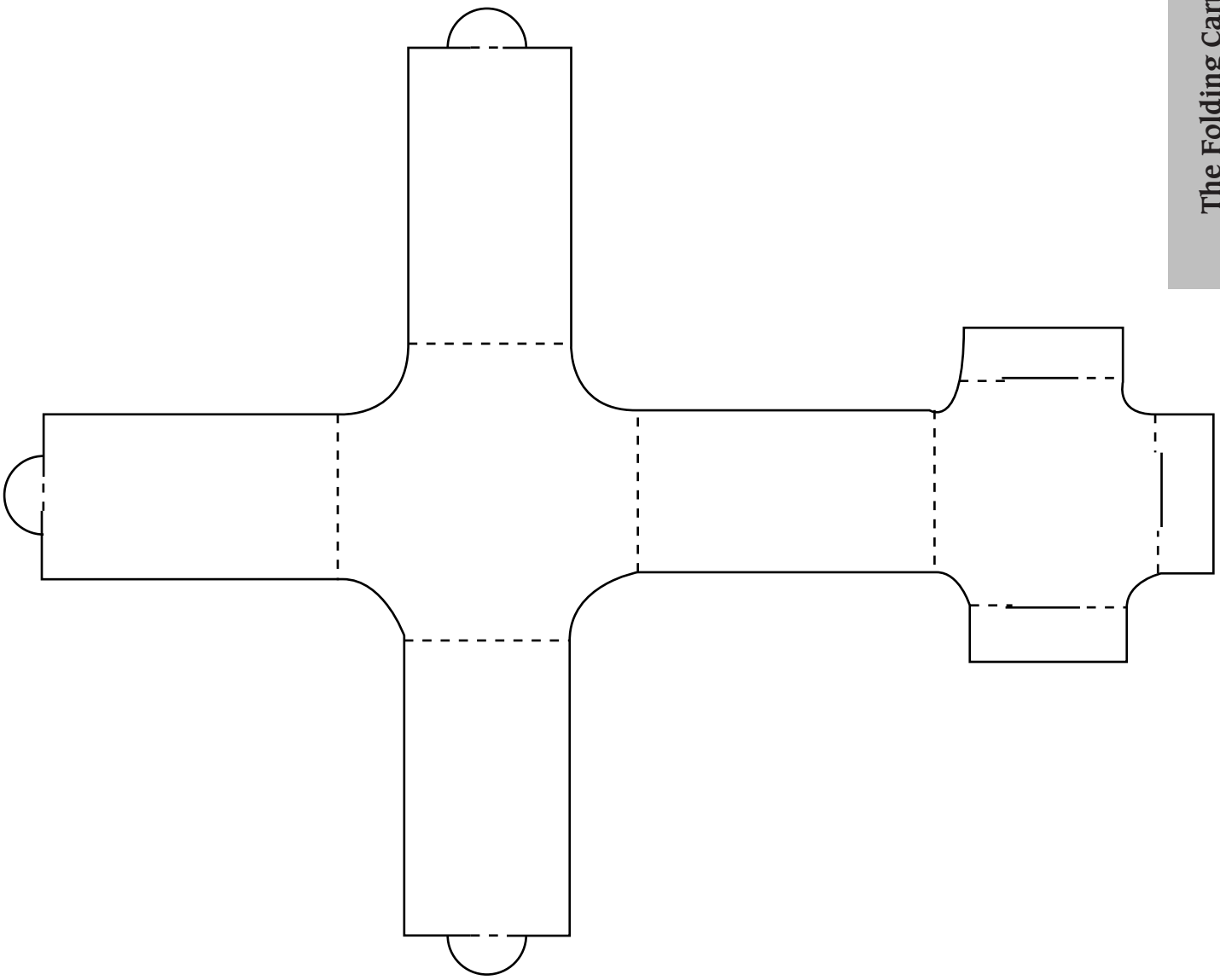


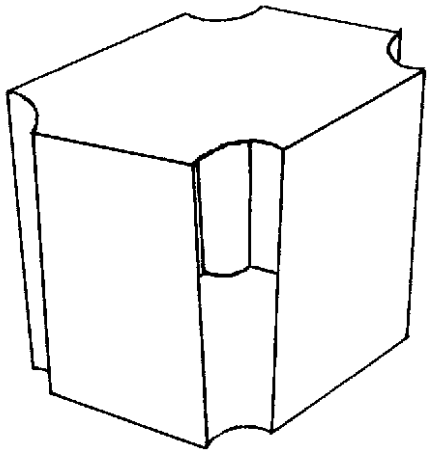


BOTTOM GLUED SINGLE-TUB SLEEVE

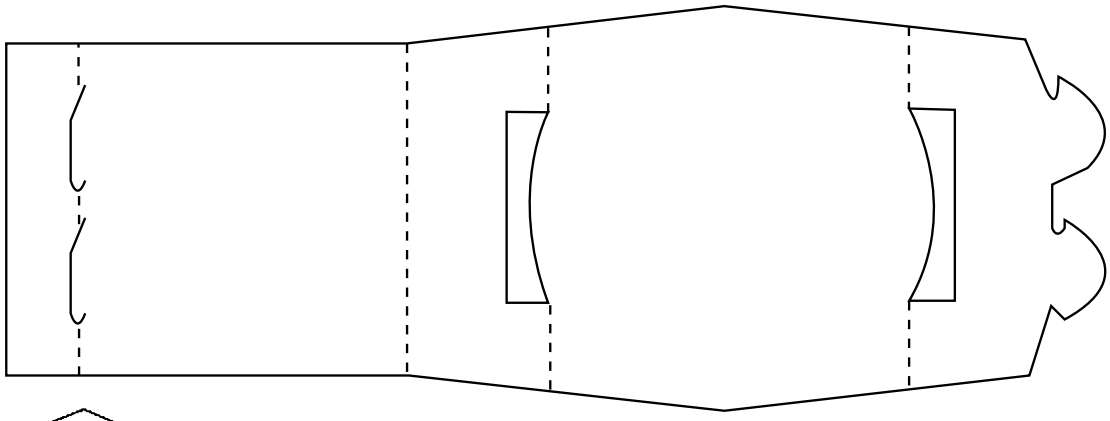


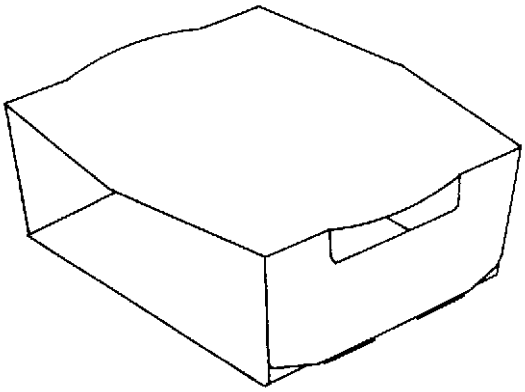




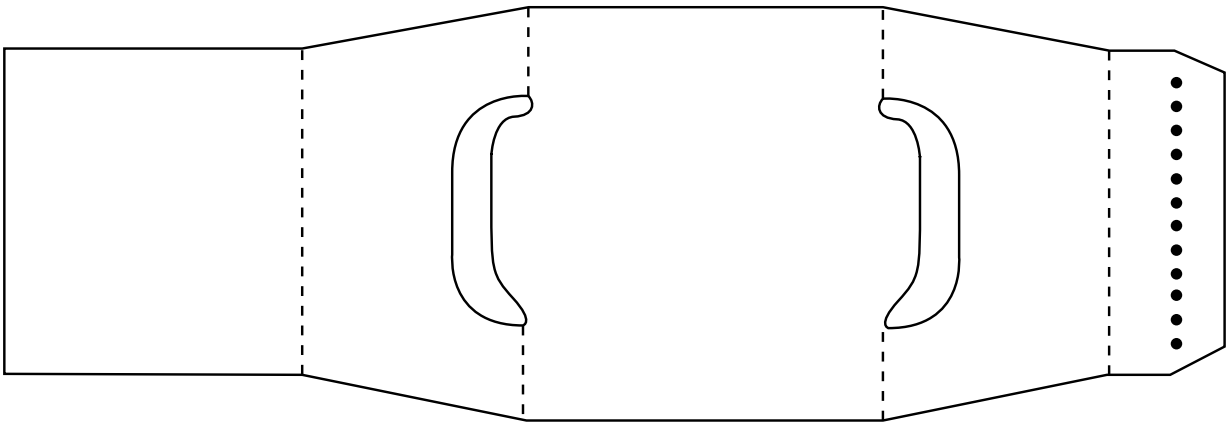


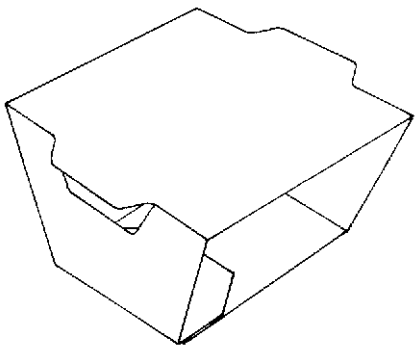
EDGE-LOCK SLEEVE FOR SINGLE CUP OR TUB

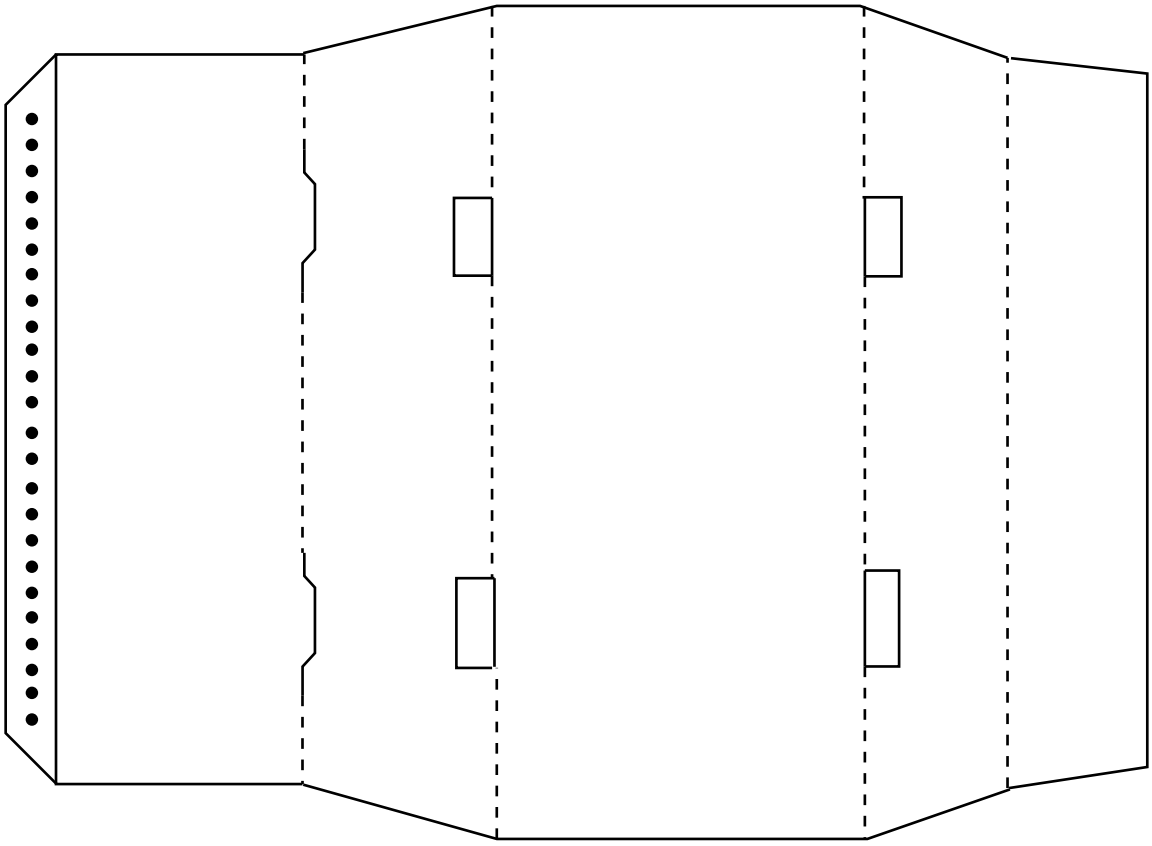


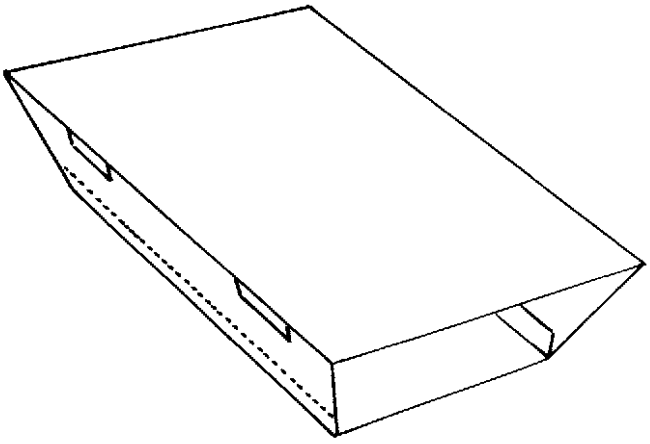


BOTTOM GLUED SLEEVE FOR SINGLE CUP OR TUB

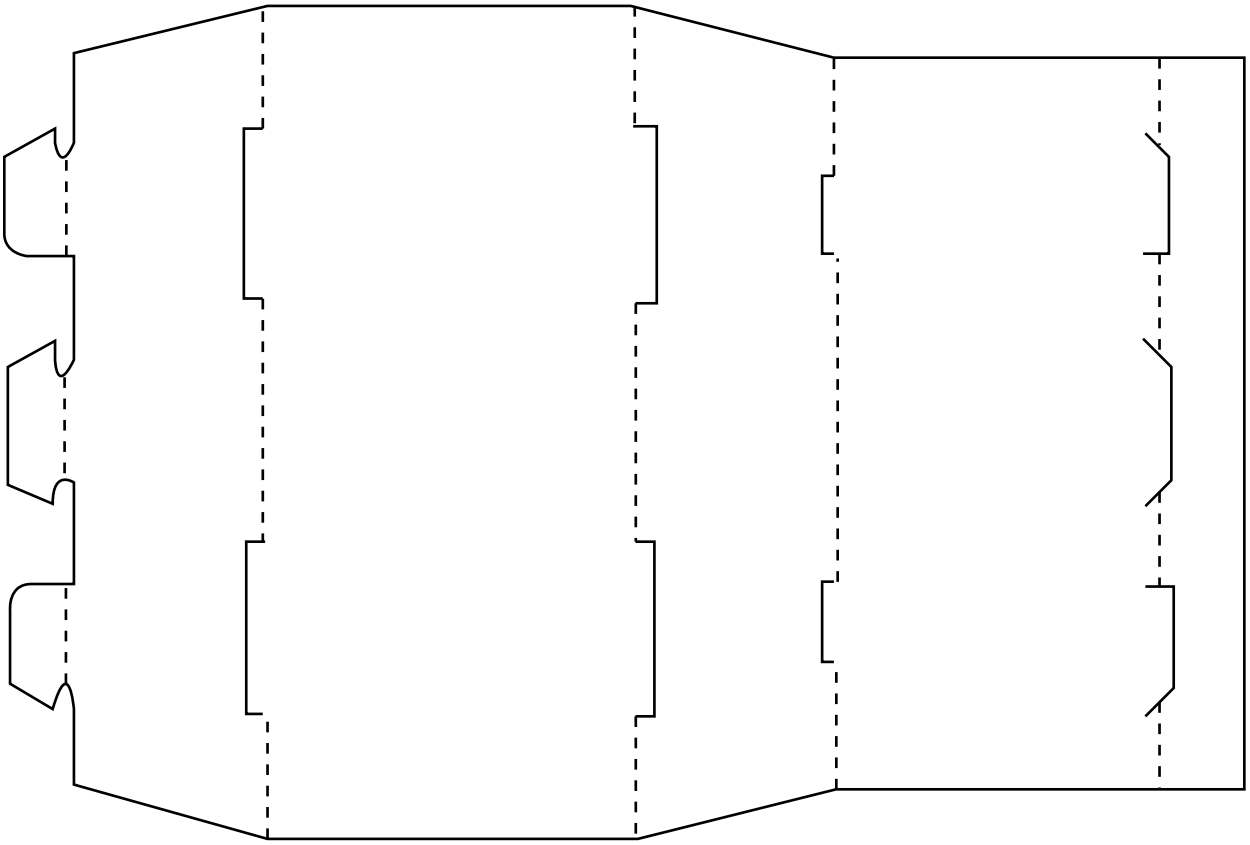


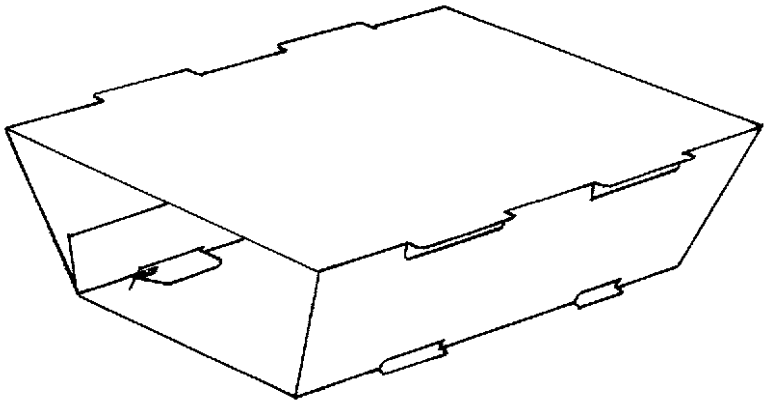




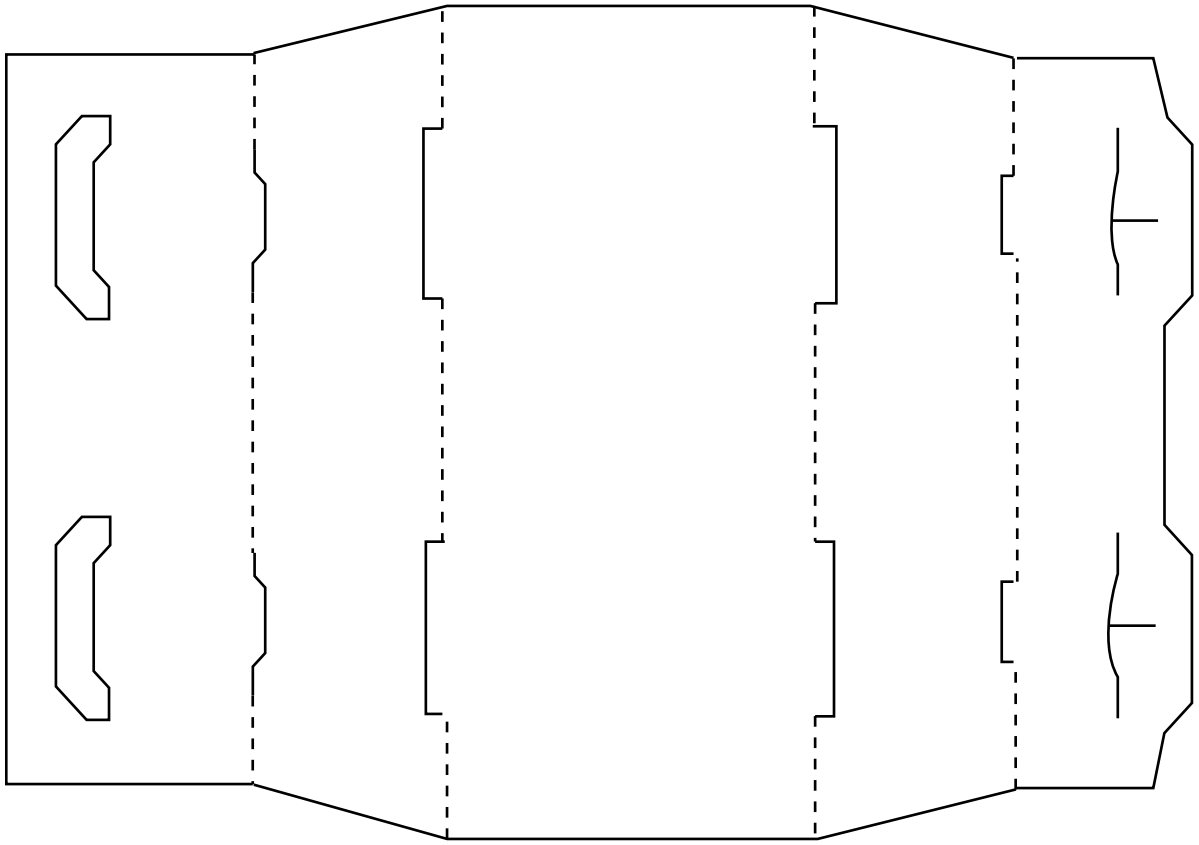


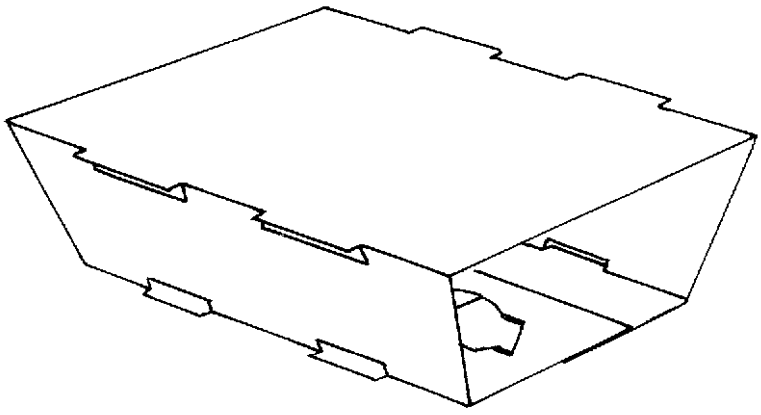
EDGE-LOCK SLEEVE



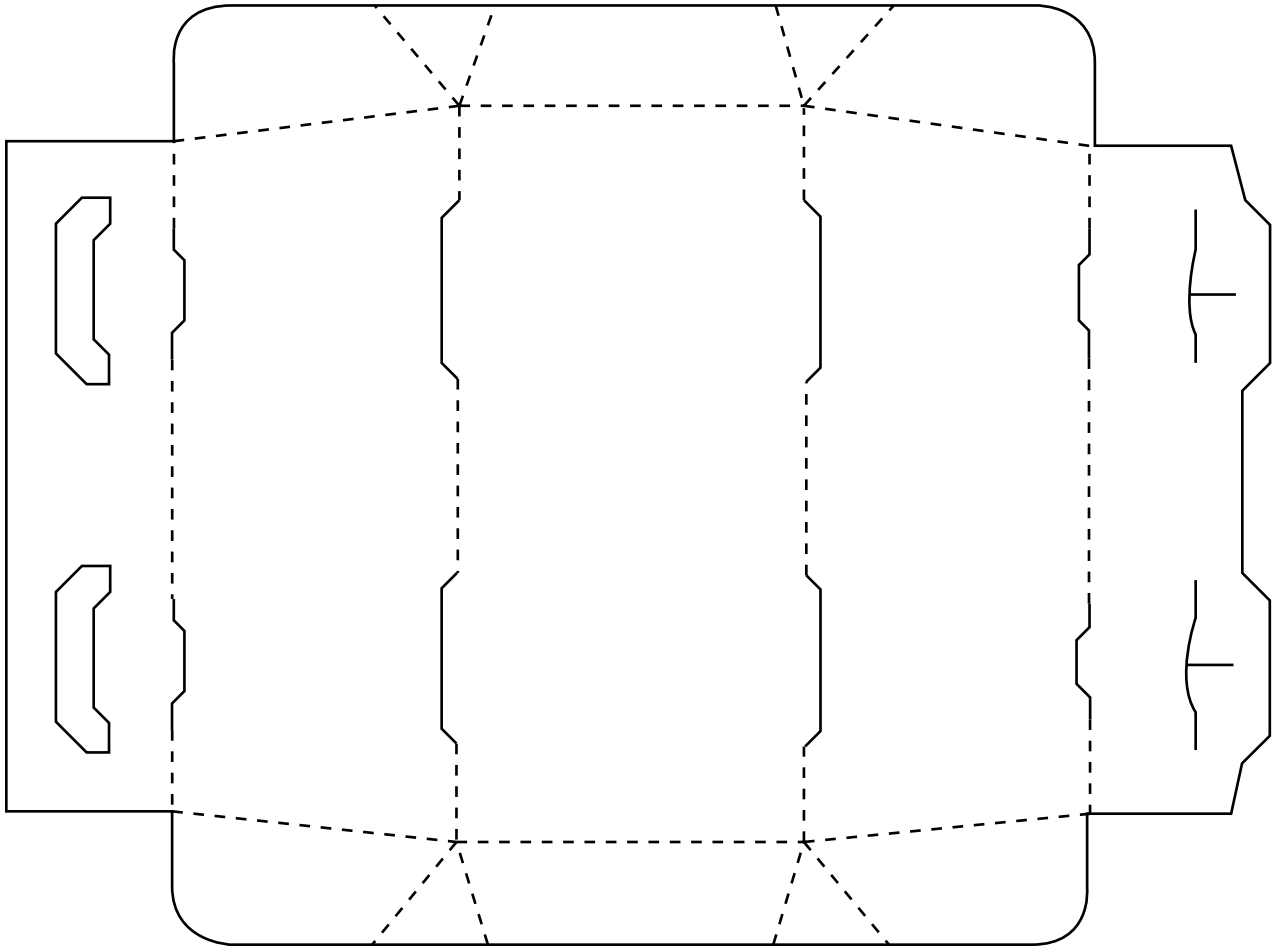


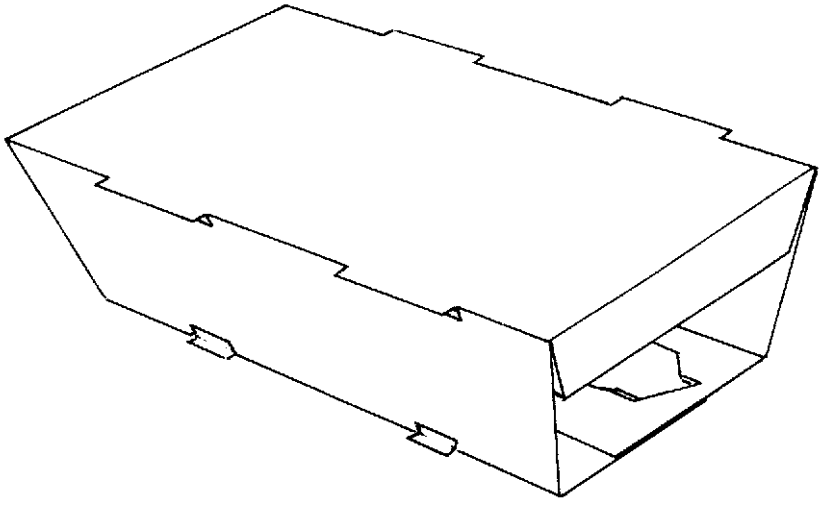
BOTTOM-LOCK SLEEVE



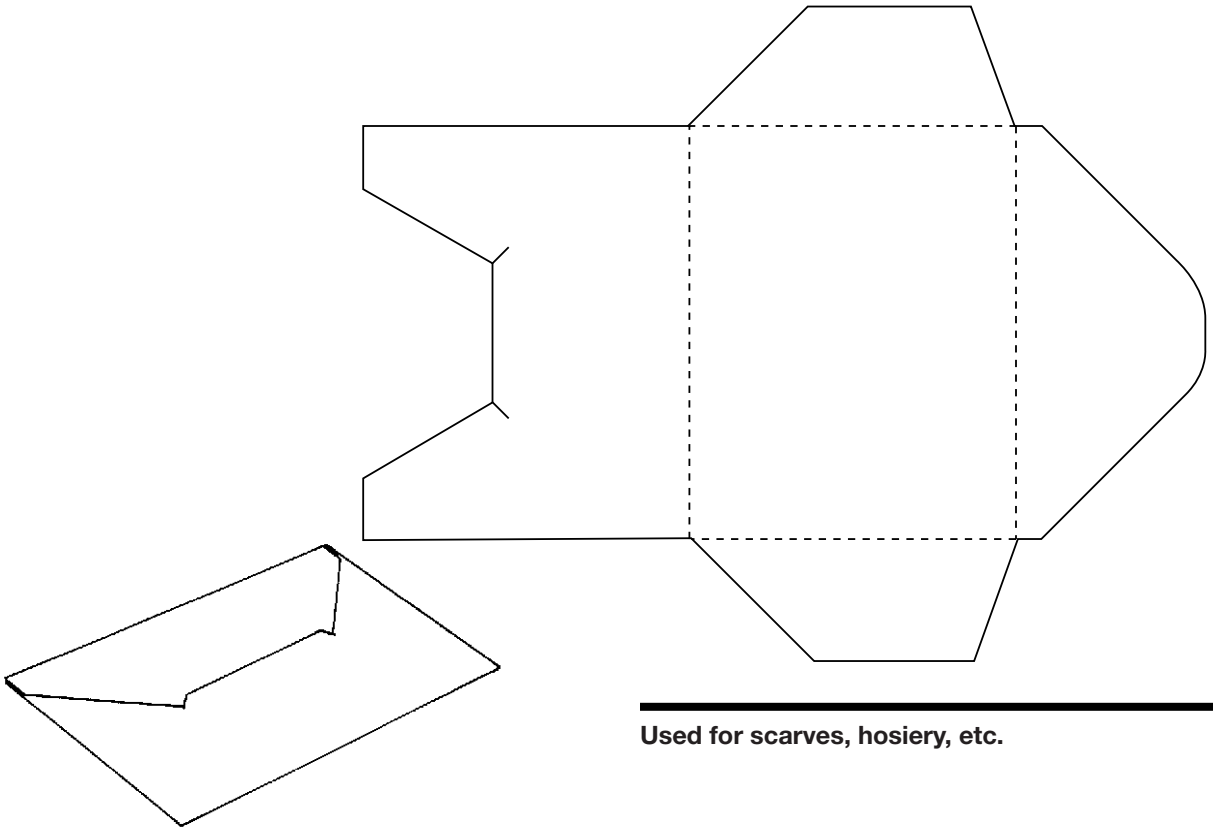


BOTTOM-LOCK SLEEVE WITH GUSSETED END PANELS



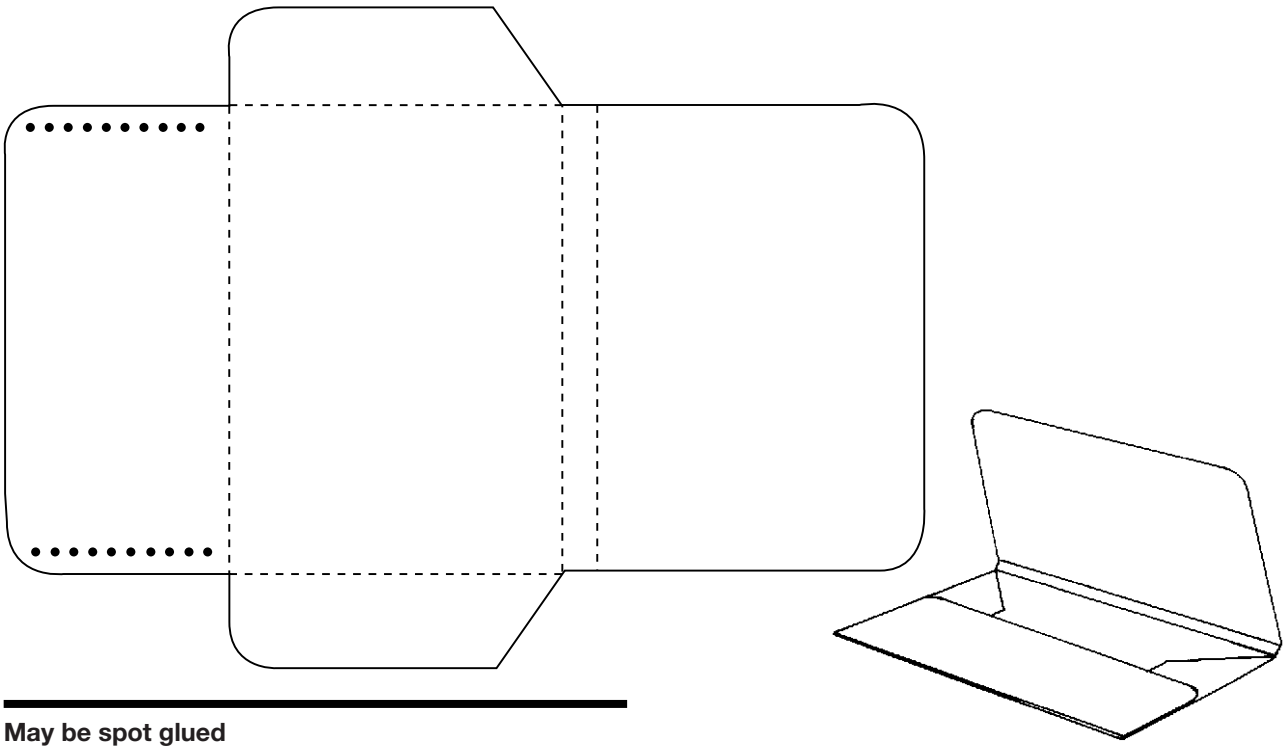


SIMPLE FOLDER FOR SHALLOW PRODUCTS



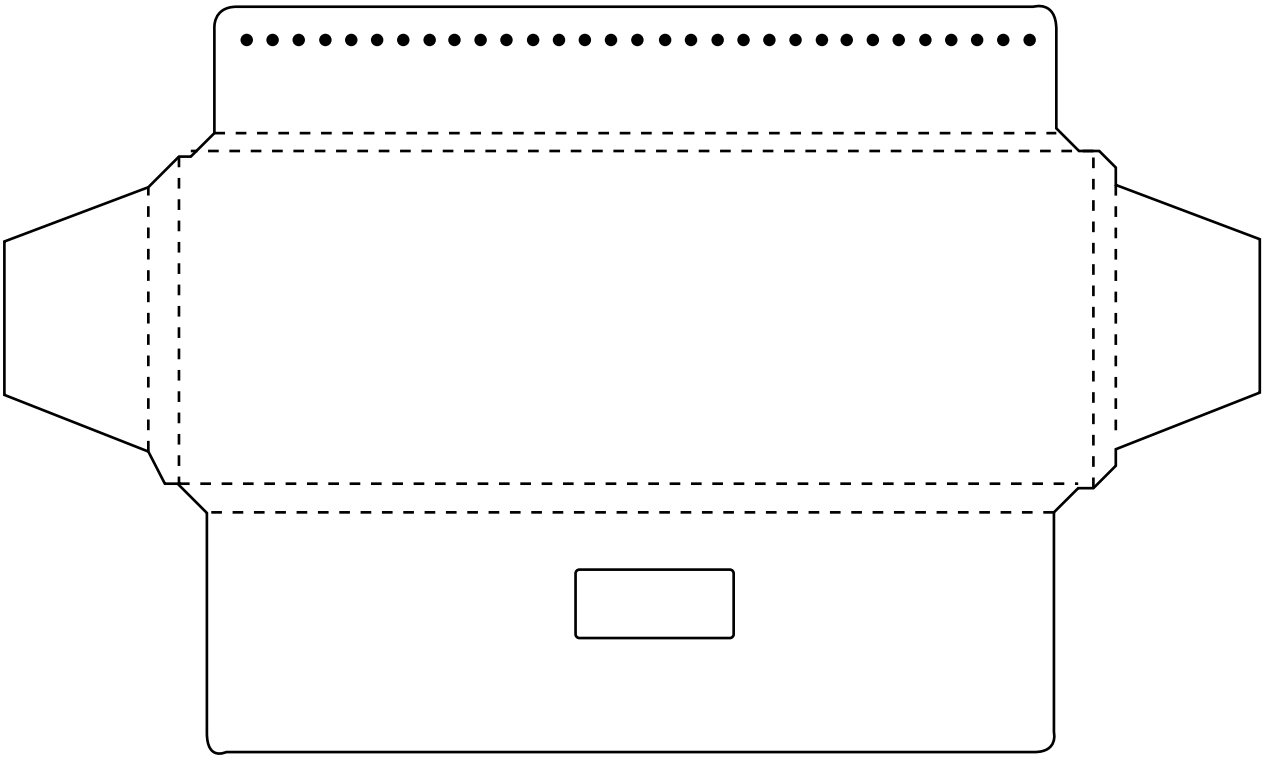
Used for scarves, hosiery, etc.

SIMPLE FOLDER FOR SHALLOW PRODUCTS

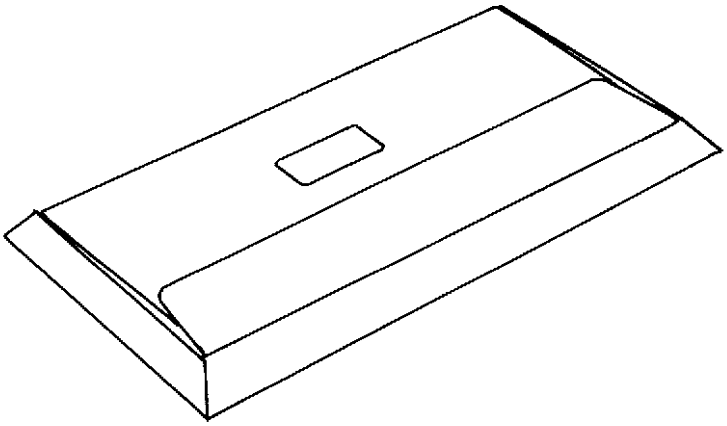


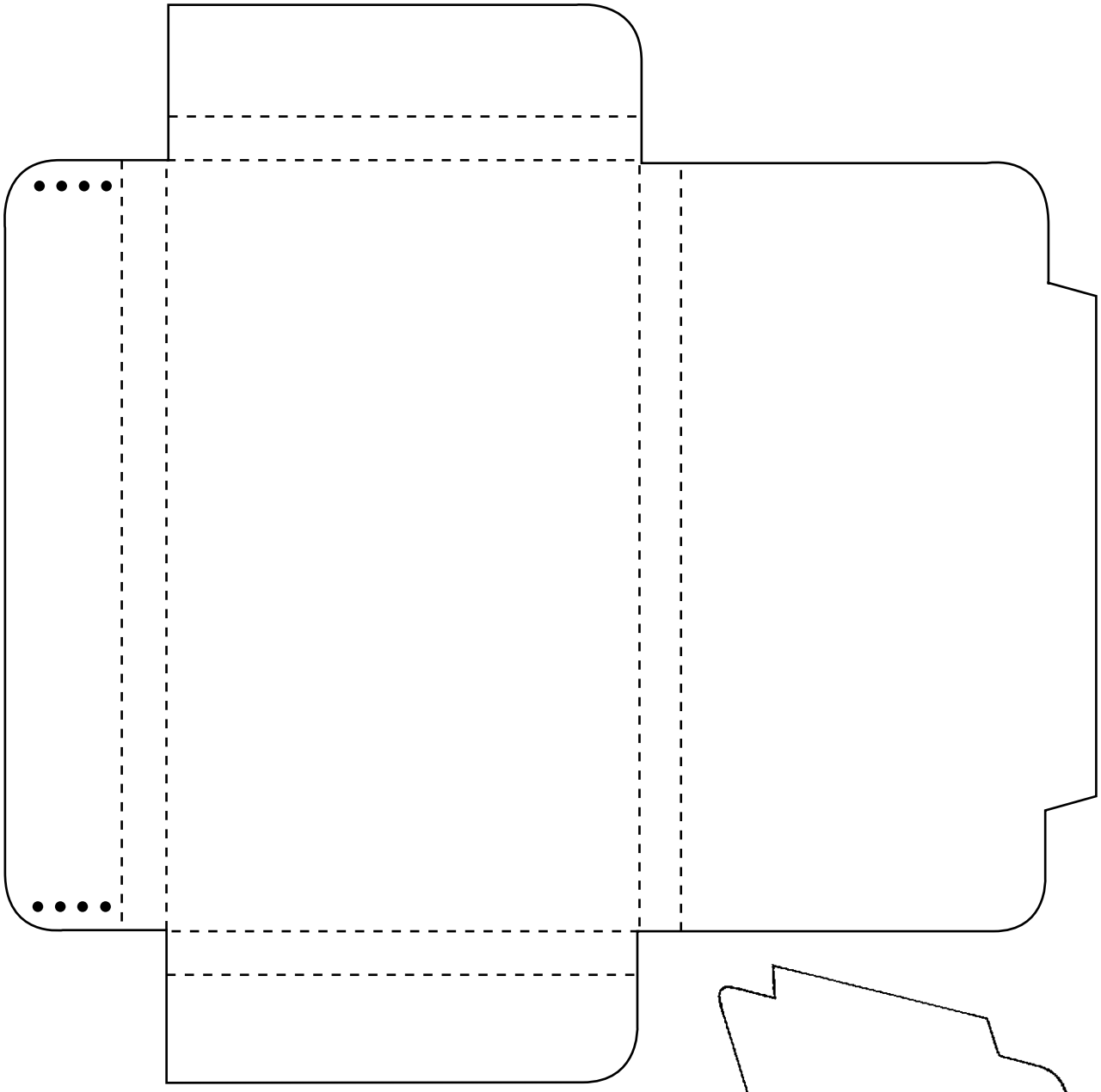
May be spot glued

SHALLOW SIDE WALL FOLDER WITH WINDOW FOR PRODUCT IDENTIFICATION

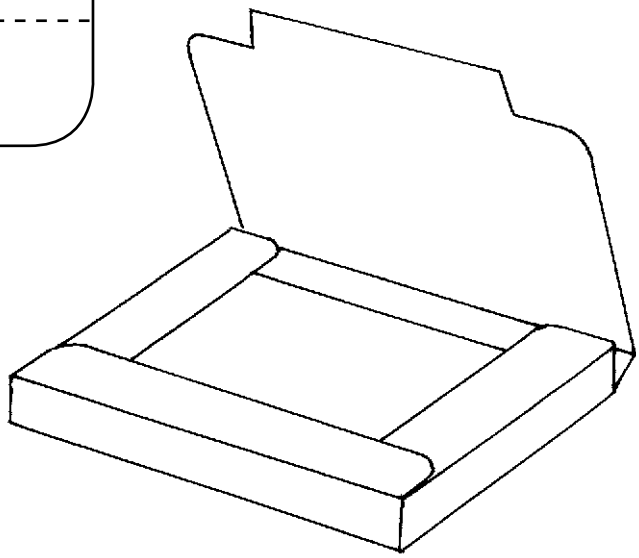


Perfect for hosiery

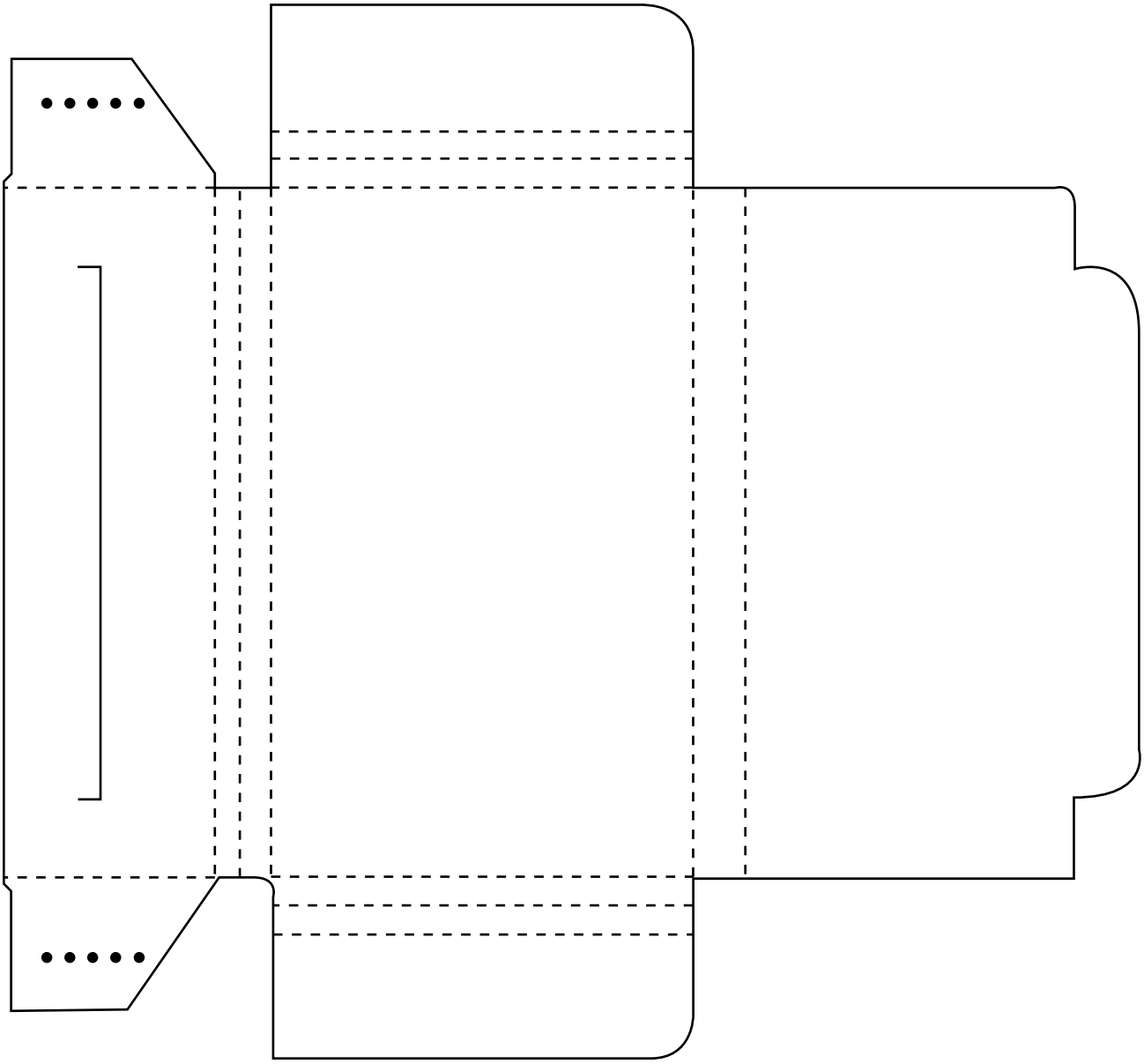




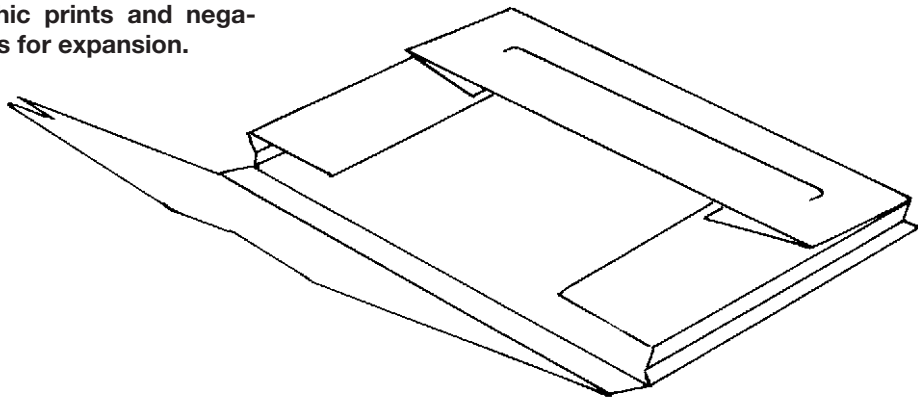
The lid will snap under the front dust flap.



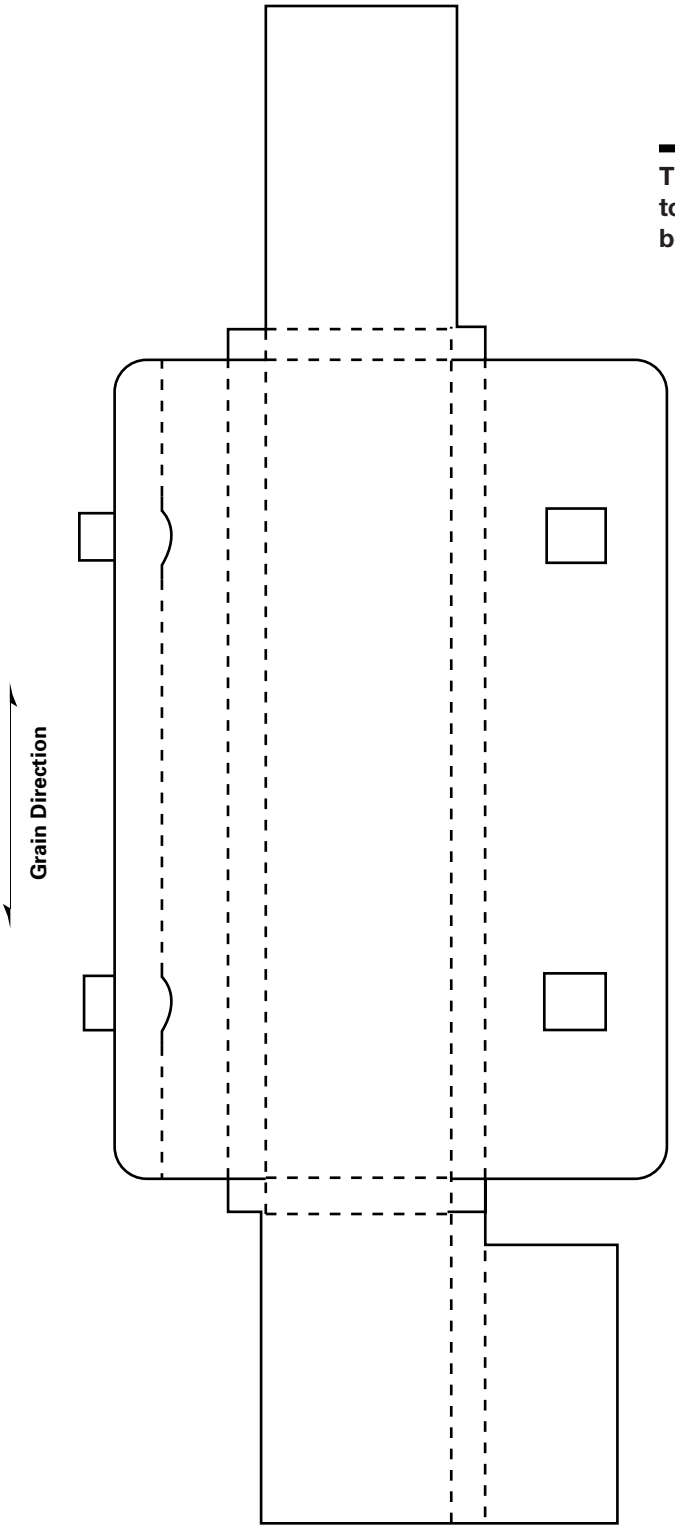
TWO-SECTION FOLDER

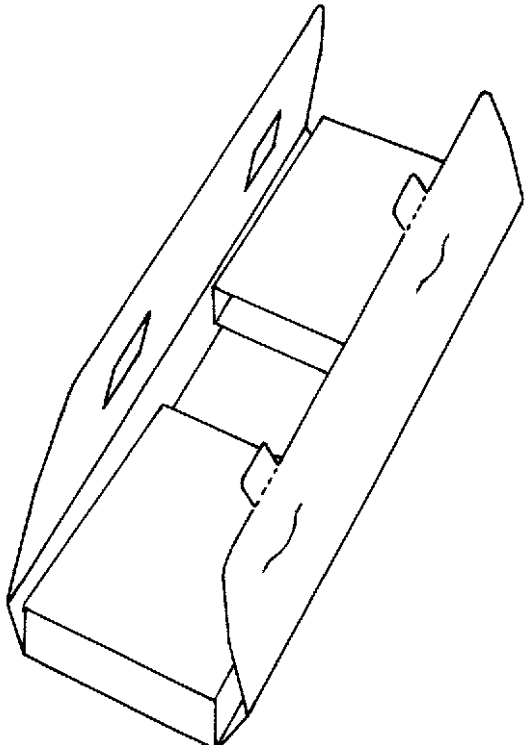


Typically used for photographic prints and negatives. The scored gusset allows for expansion.

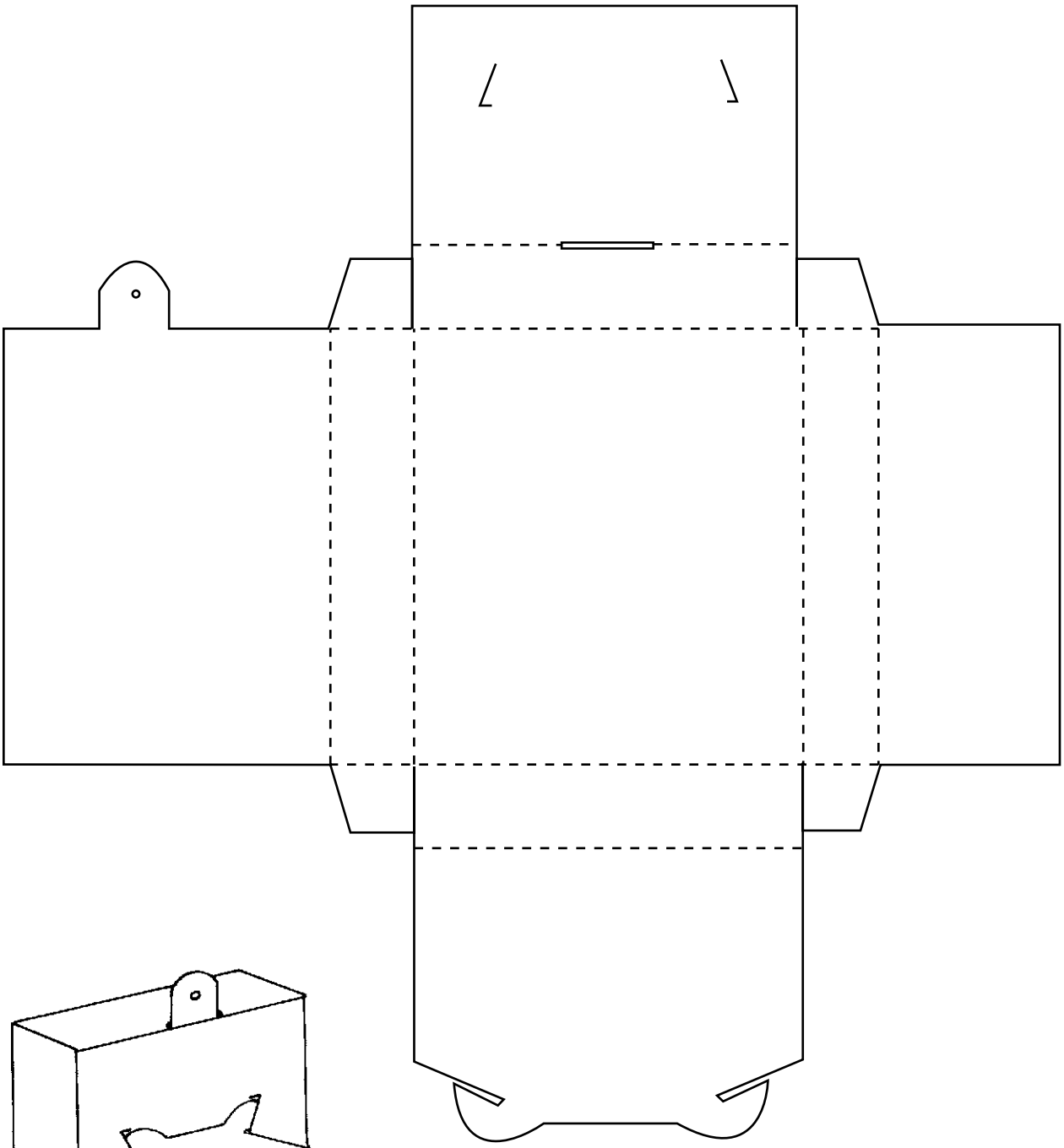


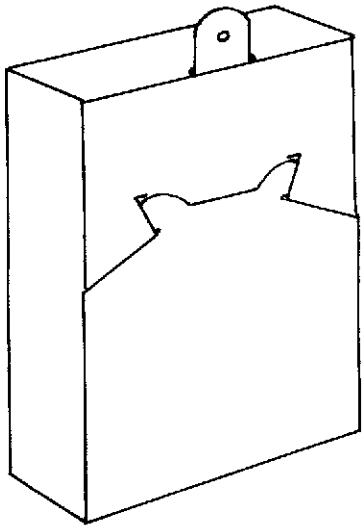
The Greenleaf style closure makes this sleeve easy to open for inspection of the product. A window may be die-cut in the package.

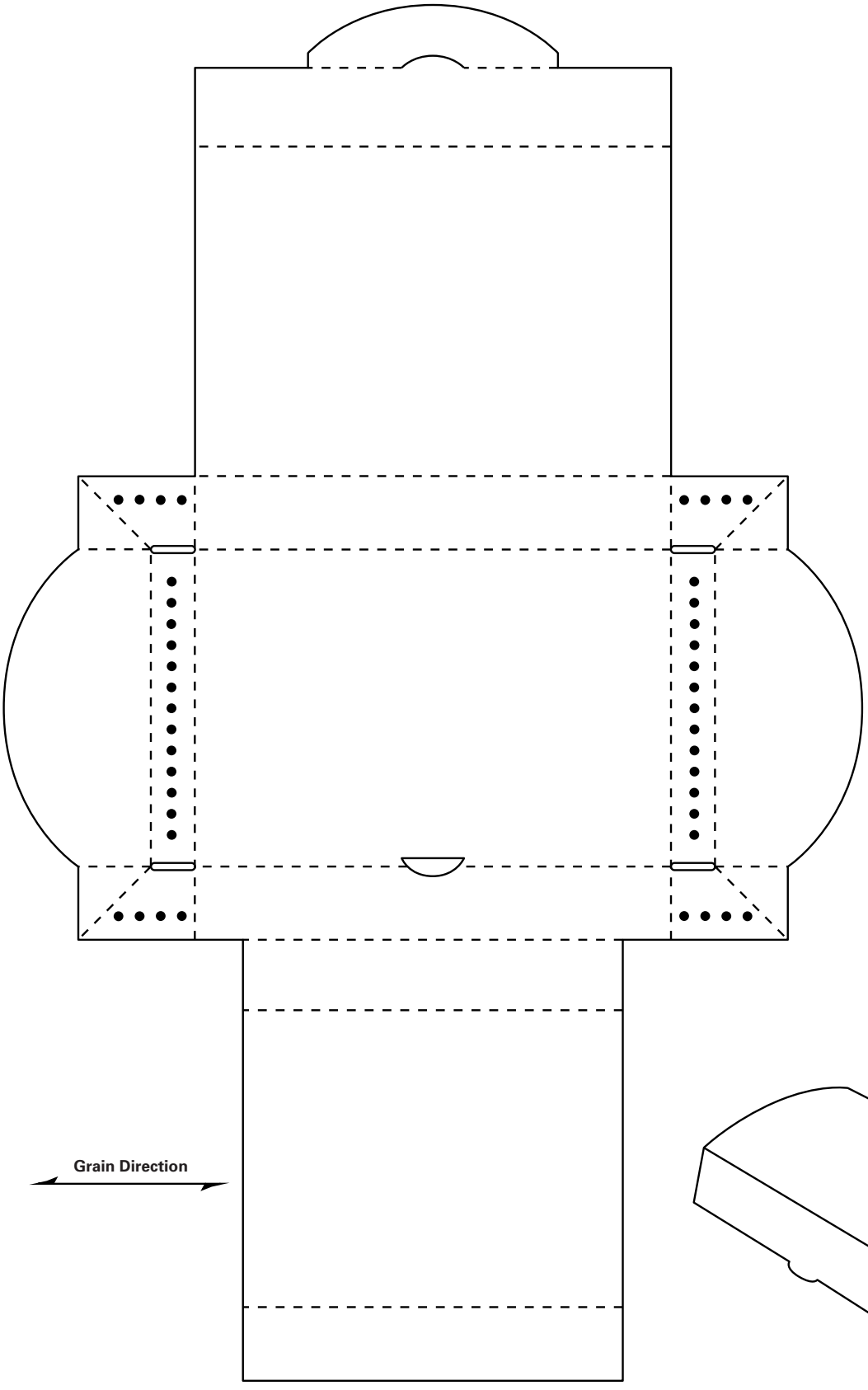




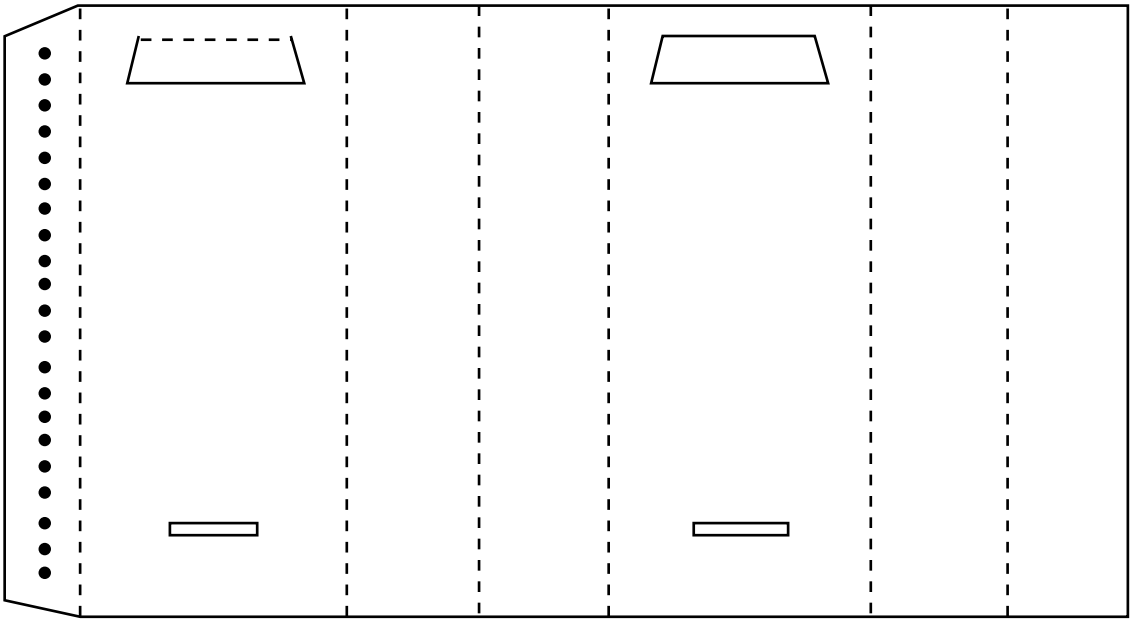
EAR-HOOK BACK PANEL WITH HANGING LOOP

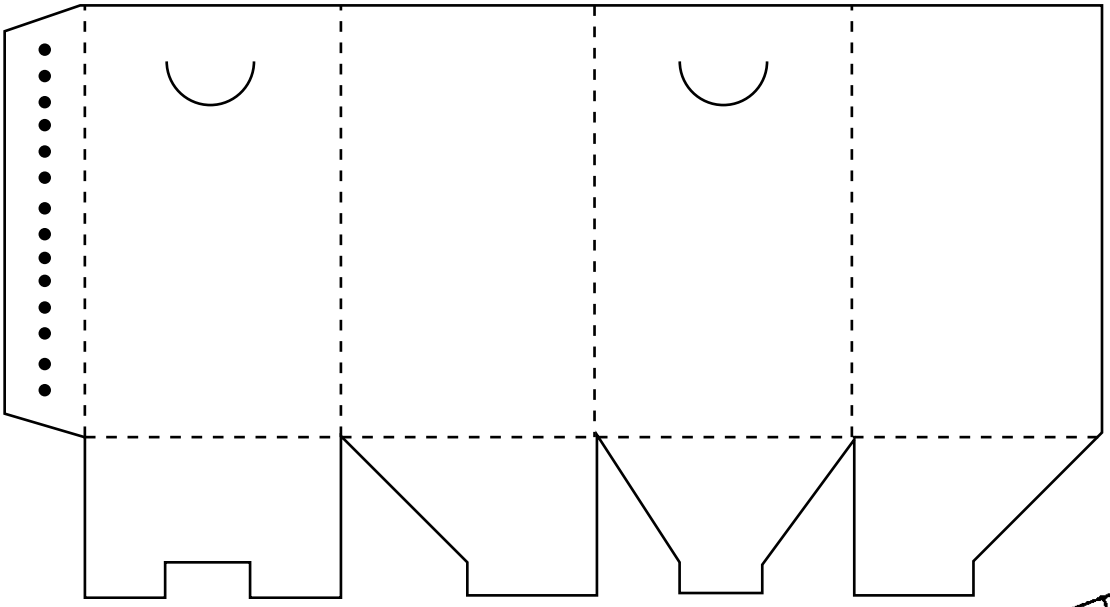


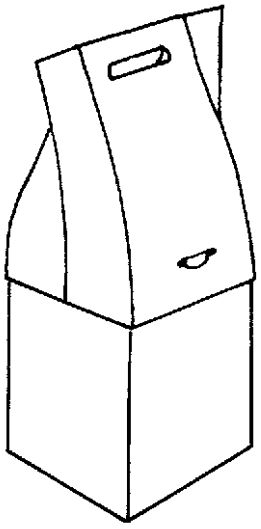



Grain Direction

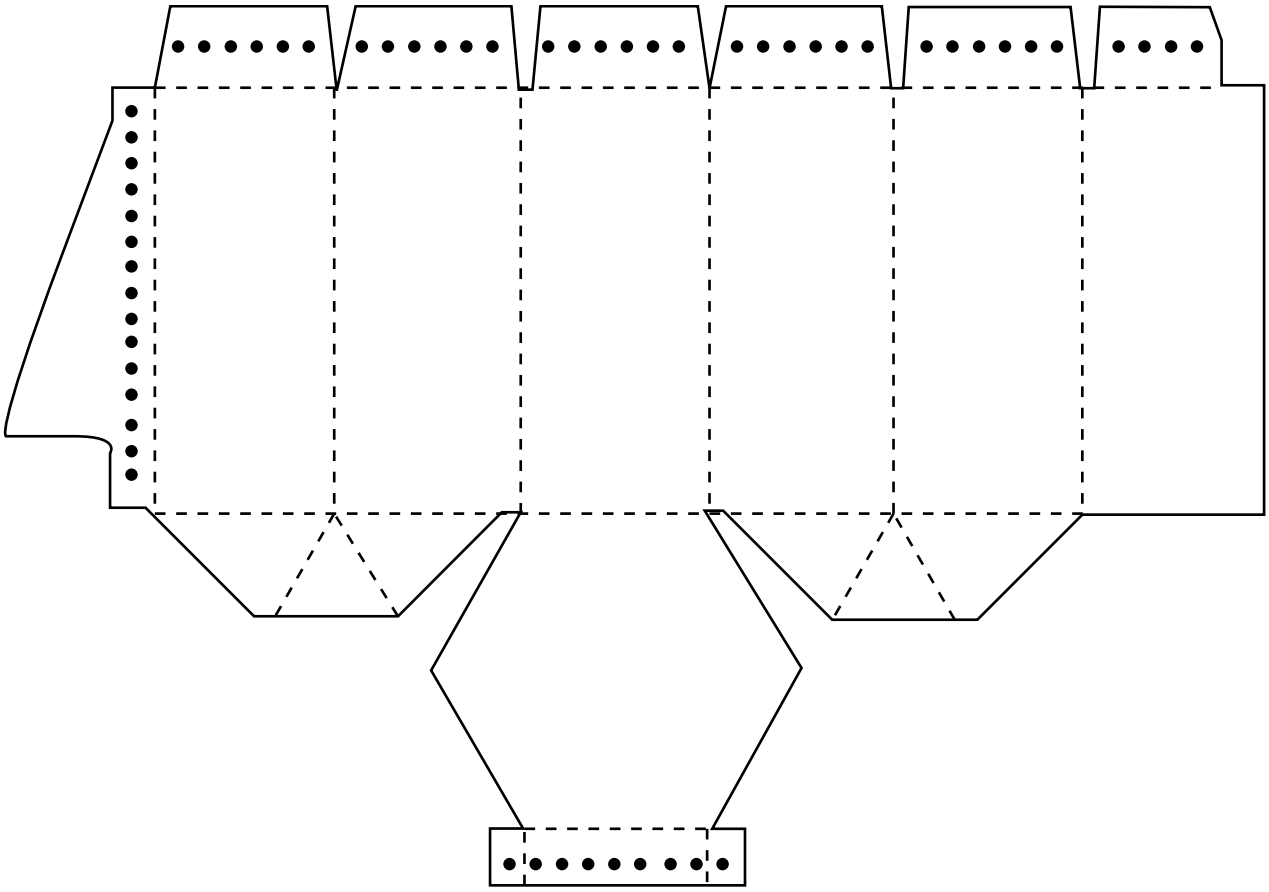
TWO-PART SLEEVE WITH 1-2-3 BOTTOM

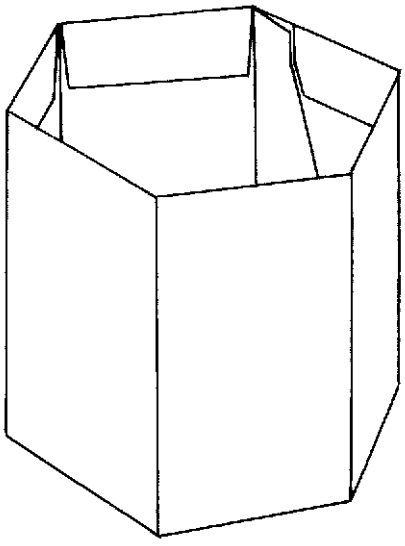


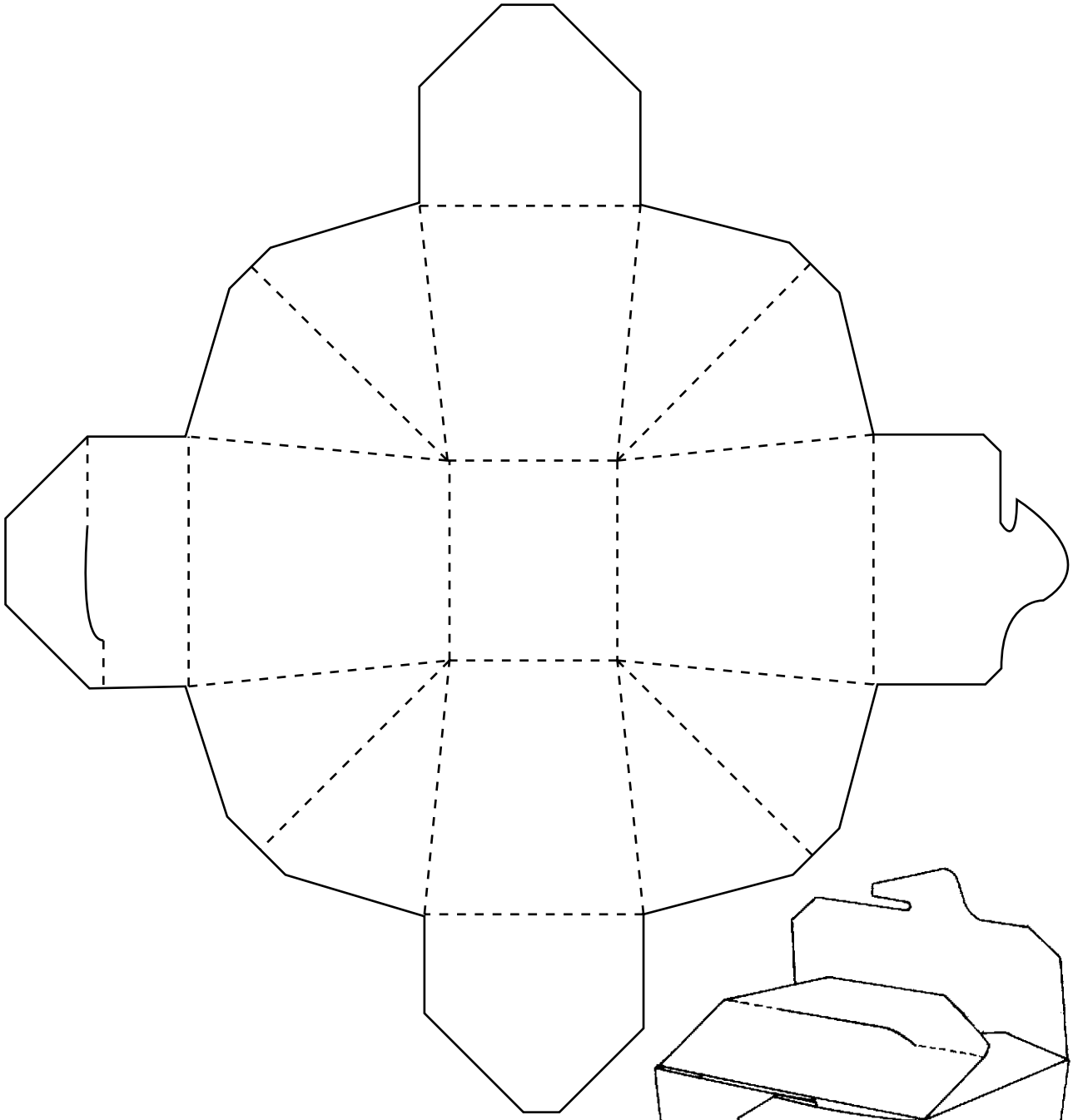


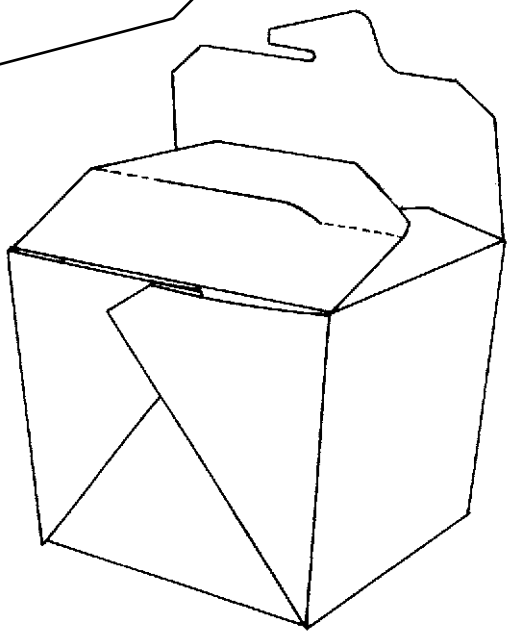


This package is developed from two interlocking sleeves with a carrying handle.

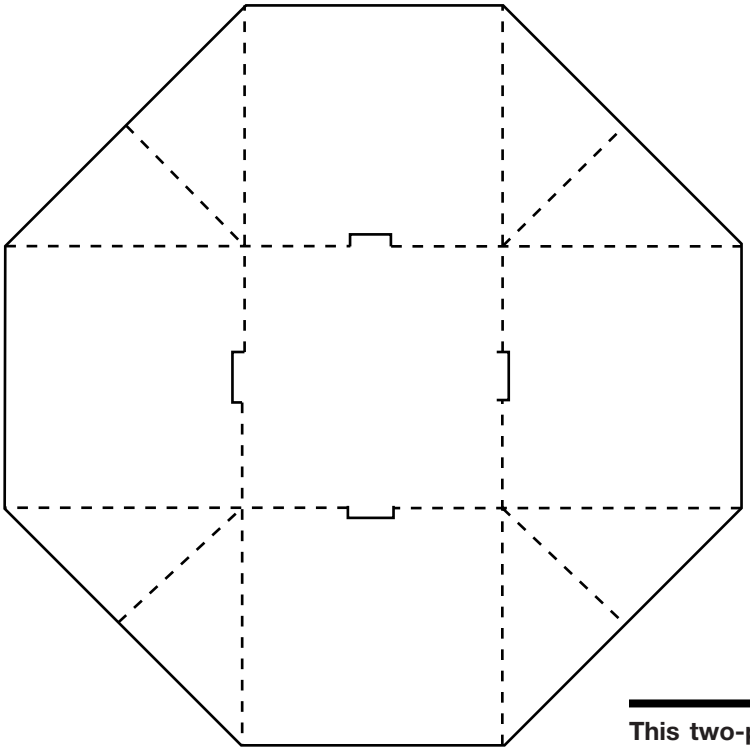




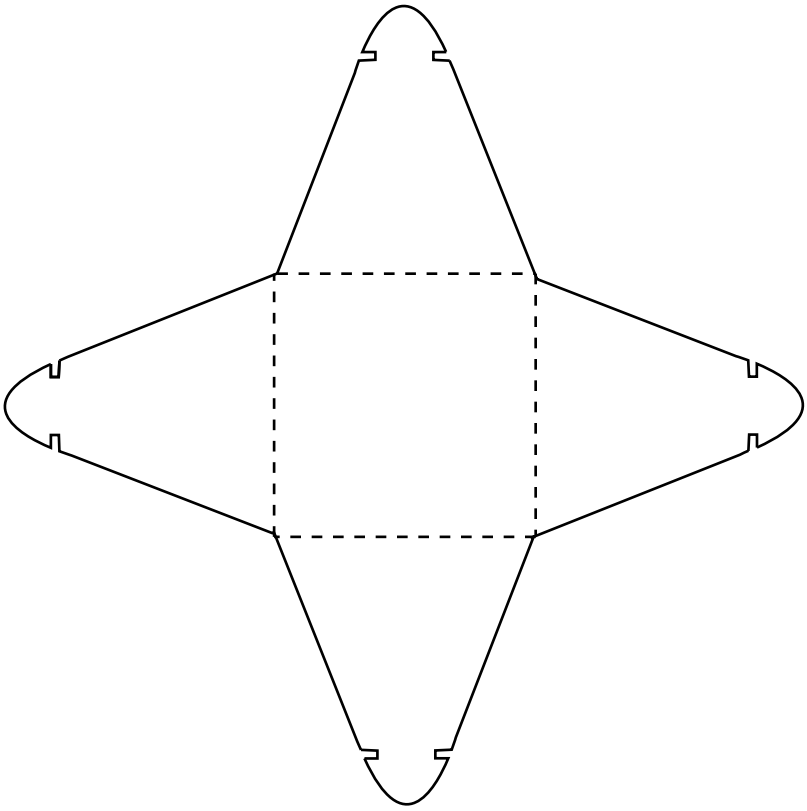


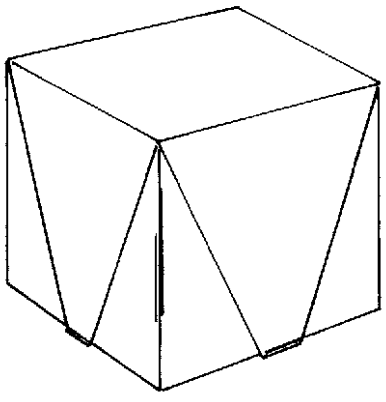


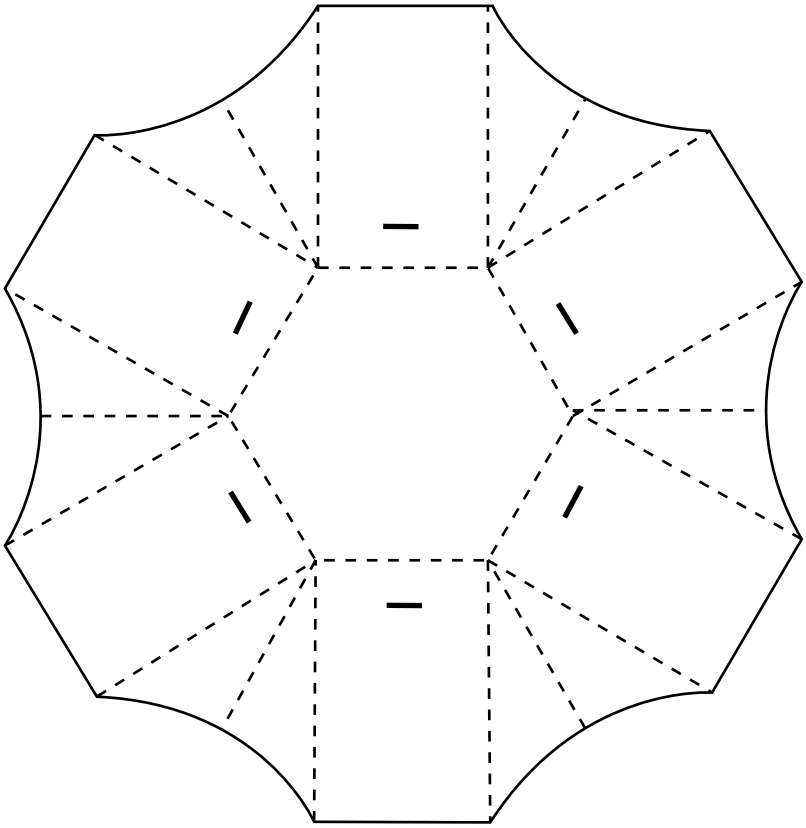
This one-piece fold-over with gusseted side panels makes an ideal waterproof carrier. It is usually held together with a small metal carrying handle.

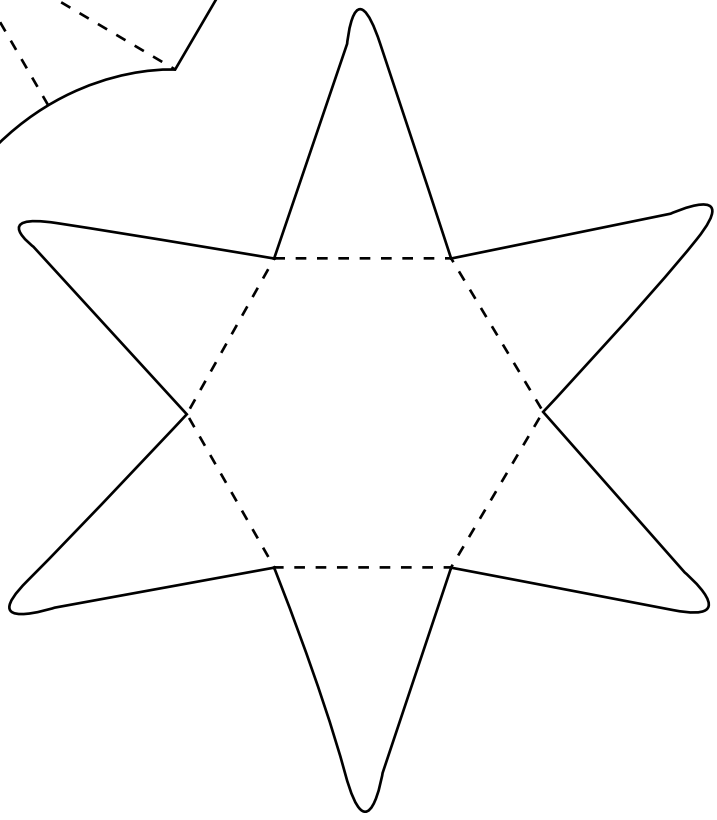


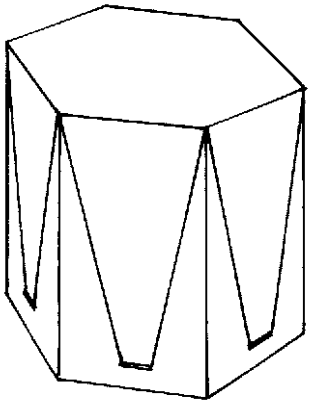
This two-piece wrap needs no glue and makes an excellent gift box, expecially if made from different colored board.



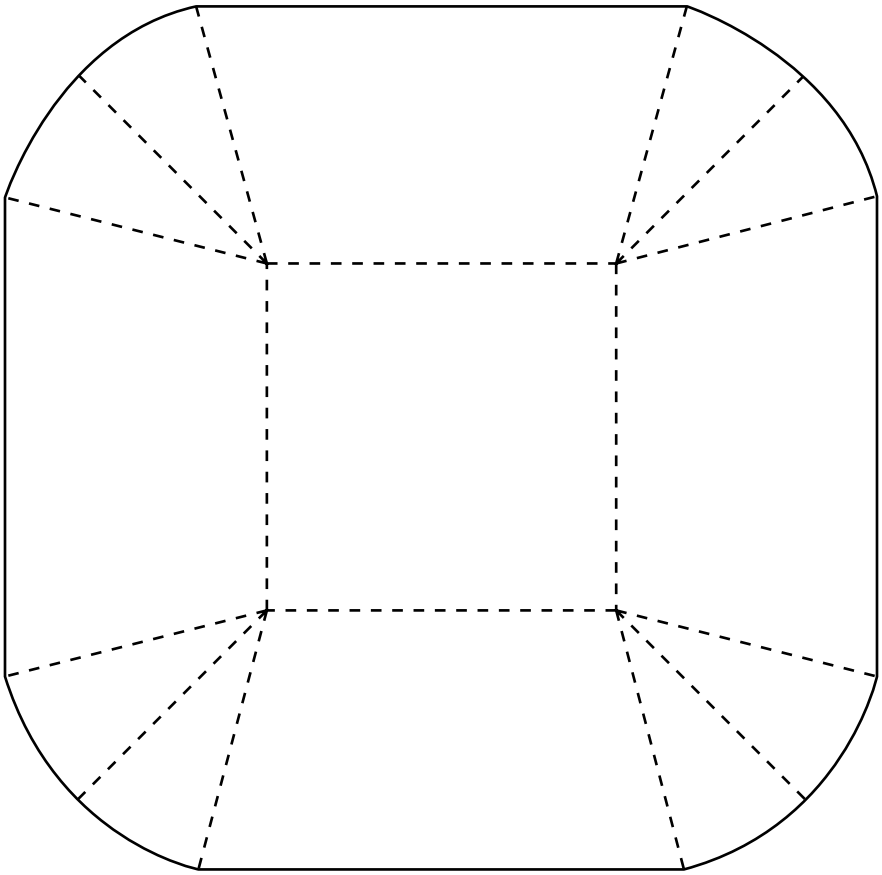






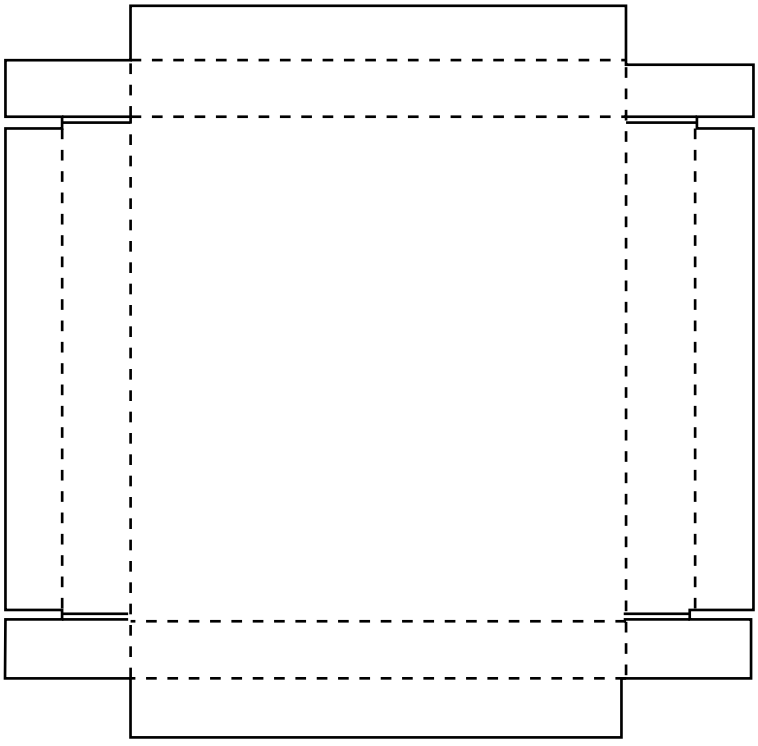


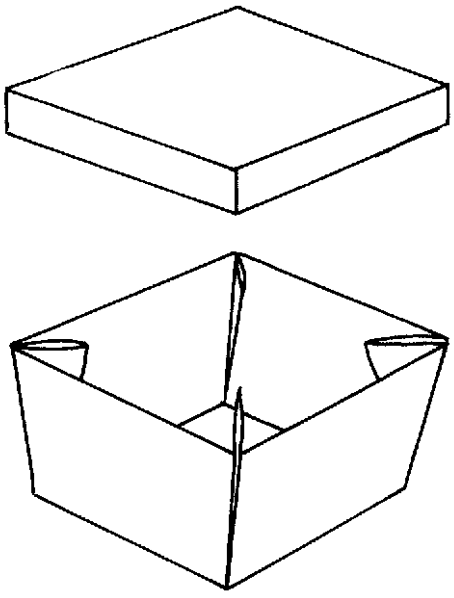
This six-sided two-piece wrap is a variation of the previous pattern.

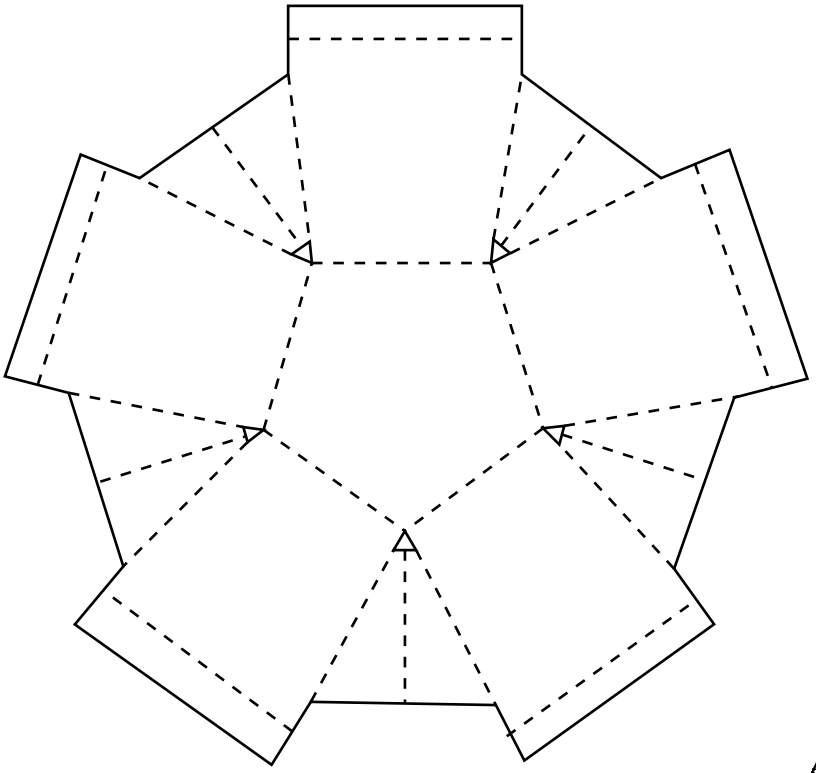


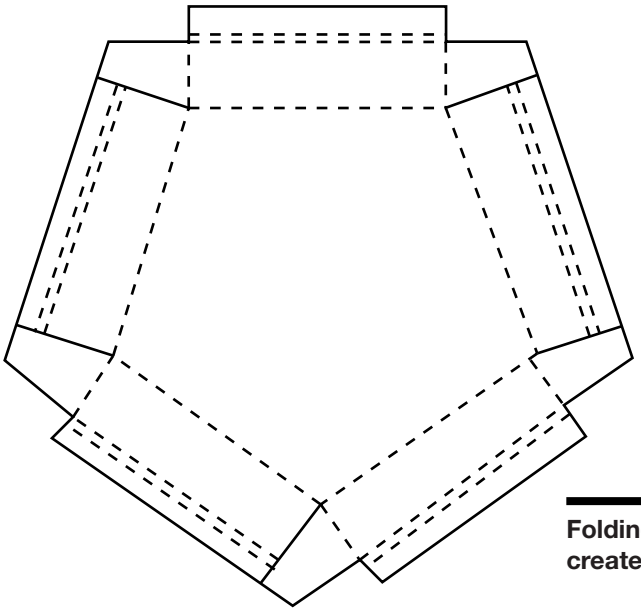
The lid with wings holds the four sides in place.

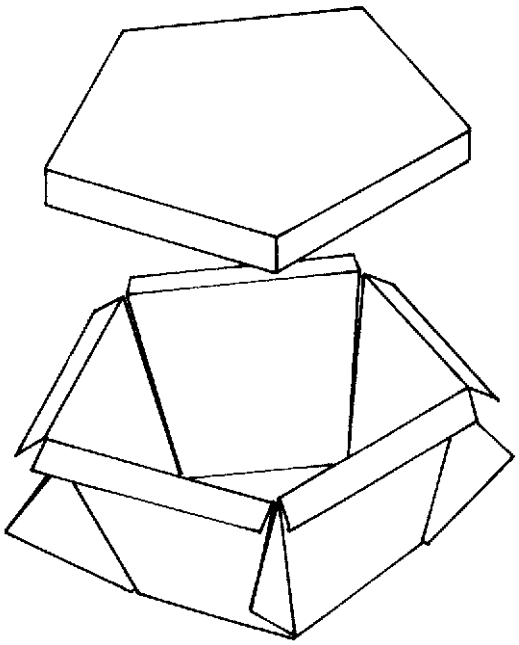
Adding four fold-over flaps on the riser panels, as in the next pattern, will serve as a locking device for the lid.



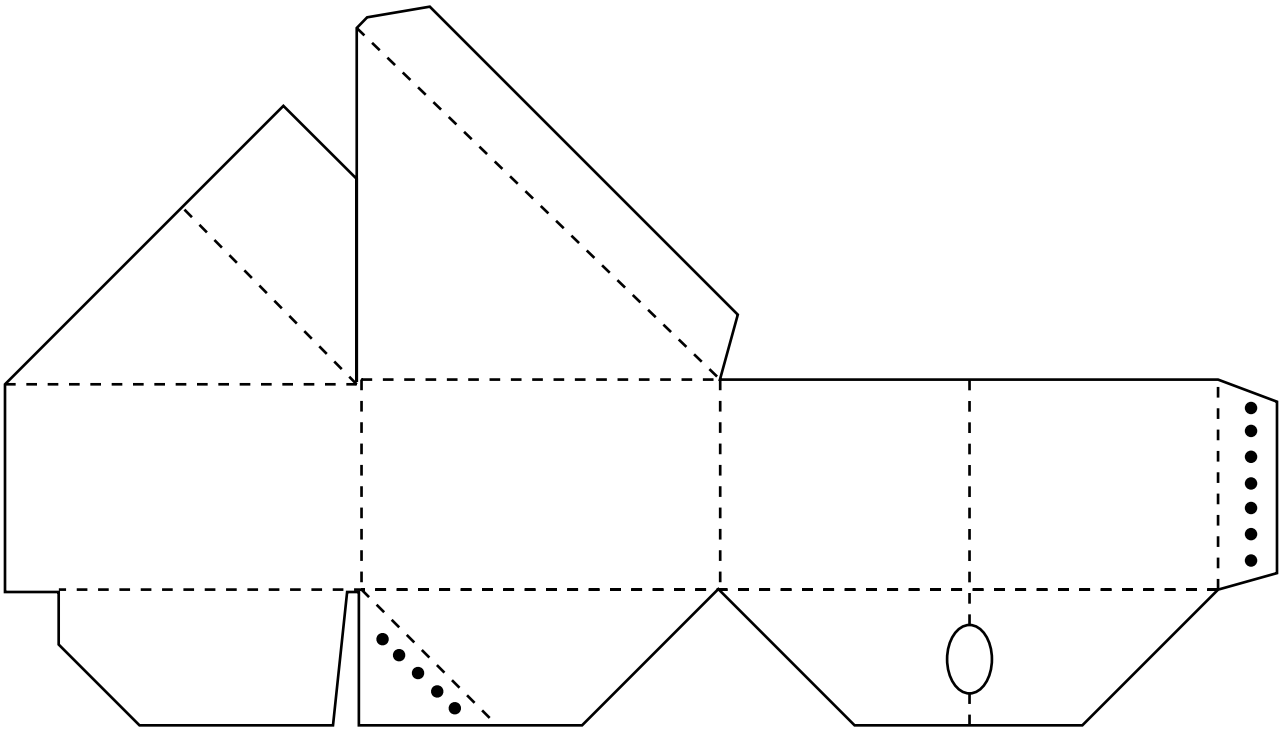


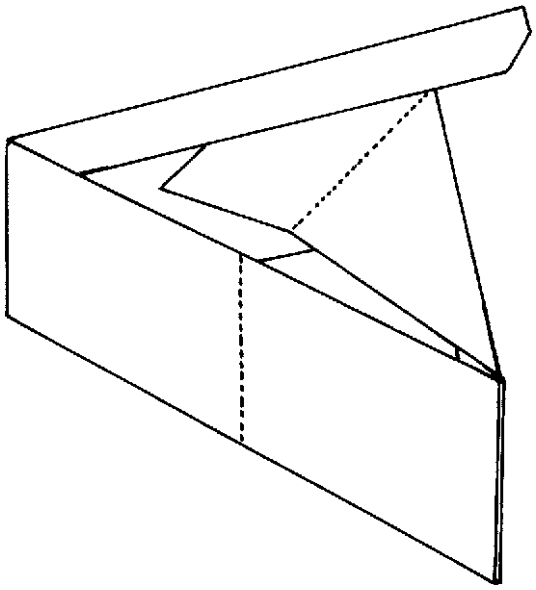




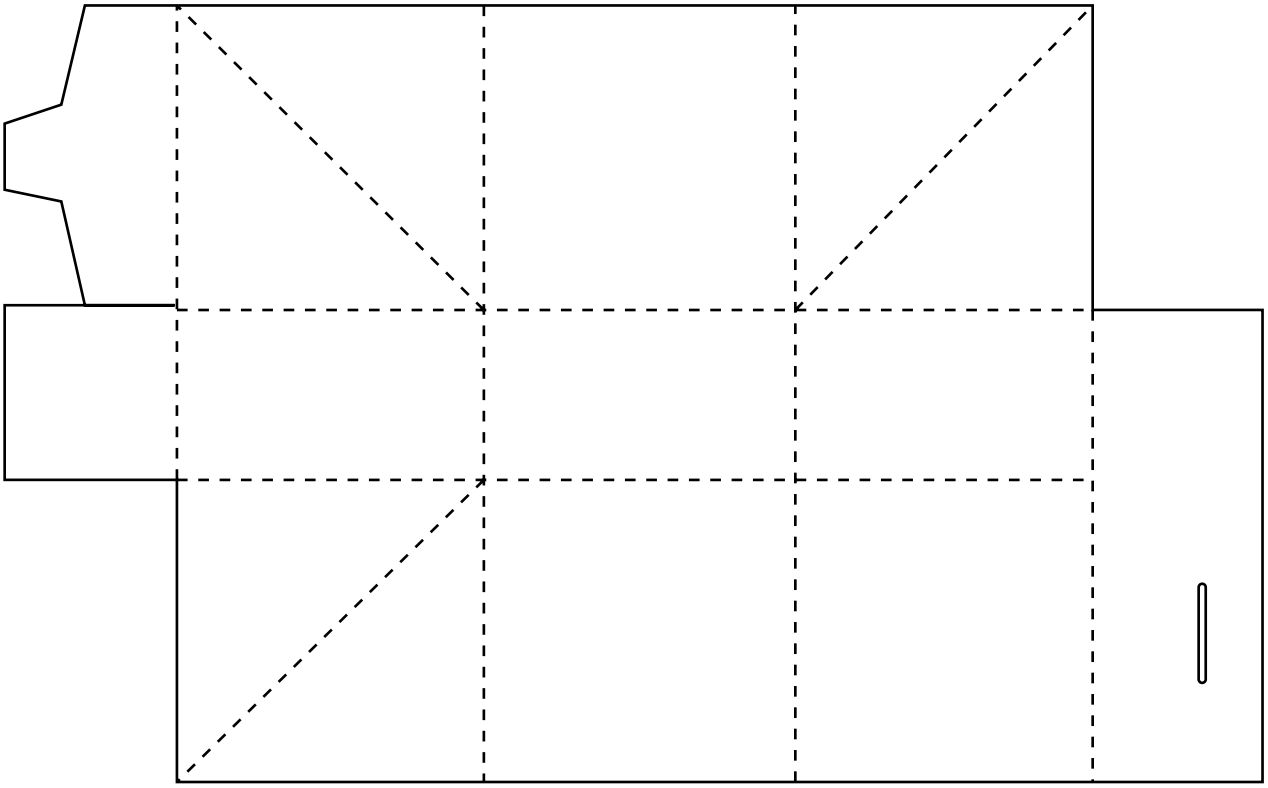


Folding the gussets to the exterior of the package creates an interesting visual effect.

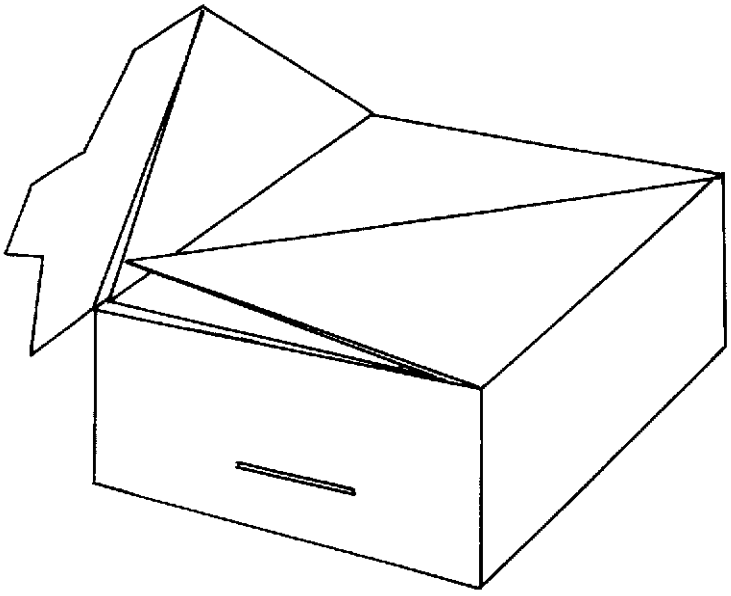


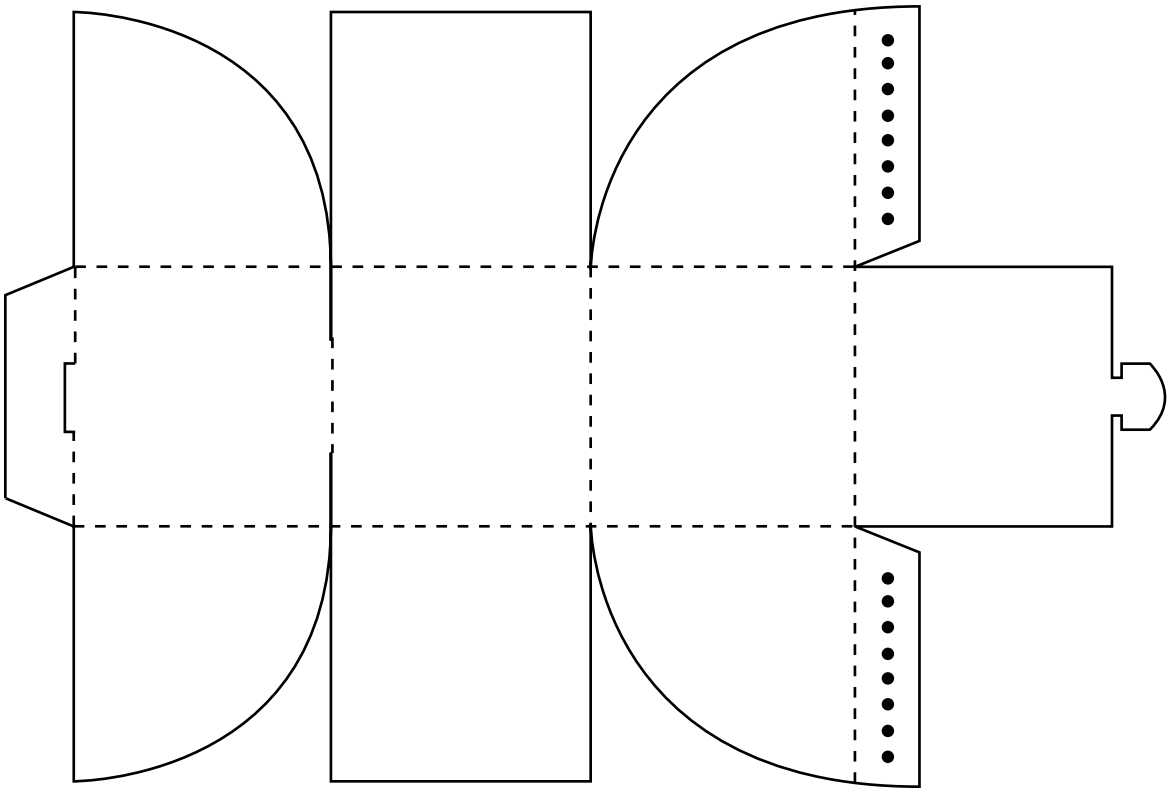


TRAINGULAR TOP AND BOTTOM WRAP

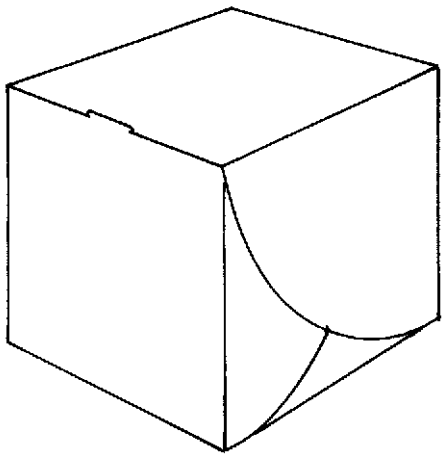


This wrap makes a handsome container, without the use of adhesives.

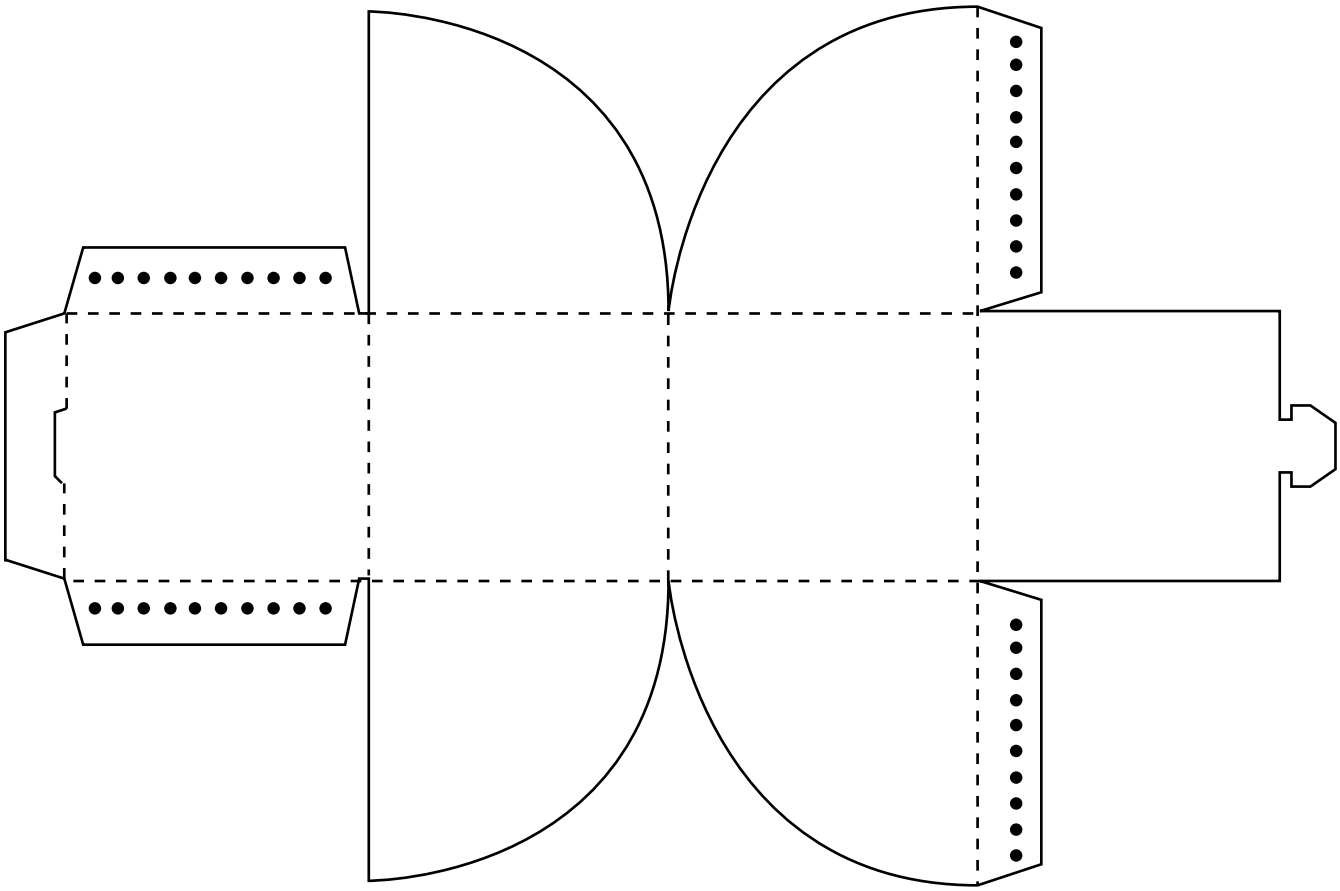


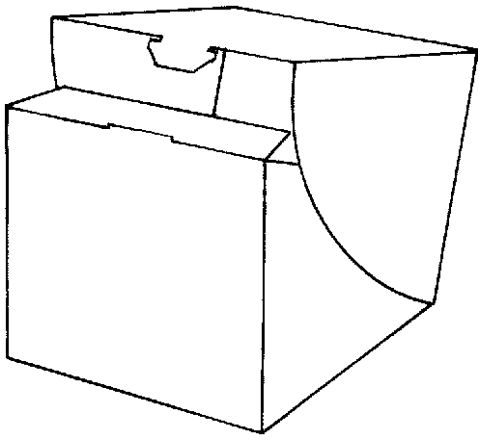


A one-piece wrap that shows an interest-catching configuration on the sides.

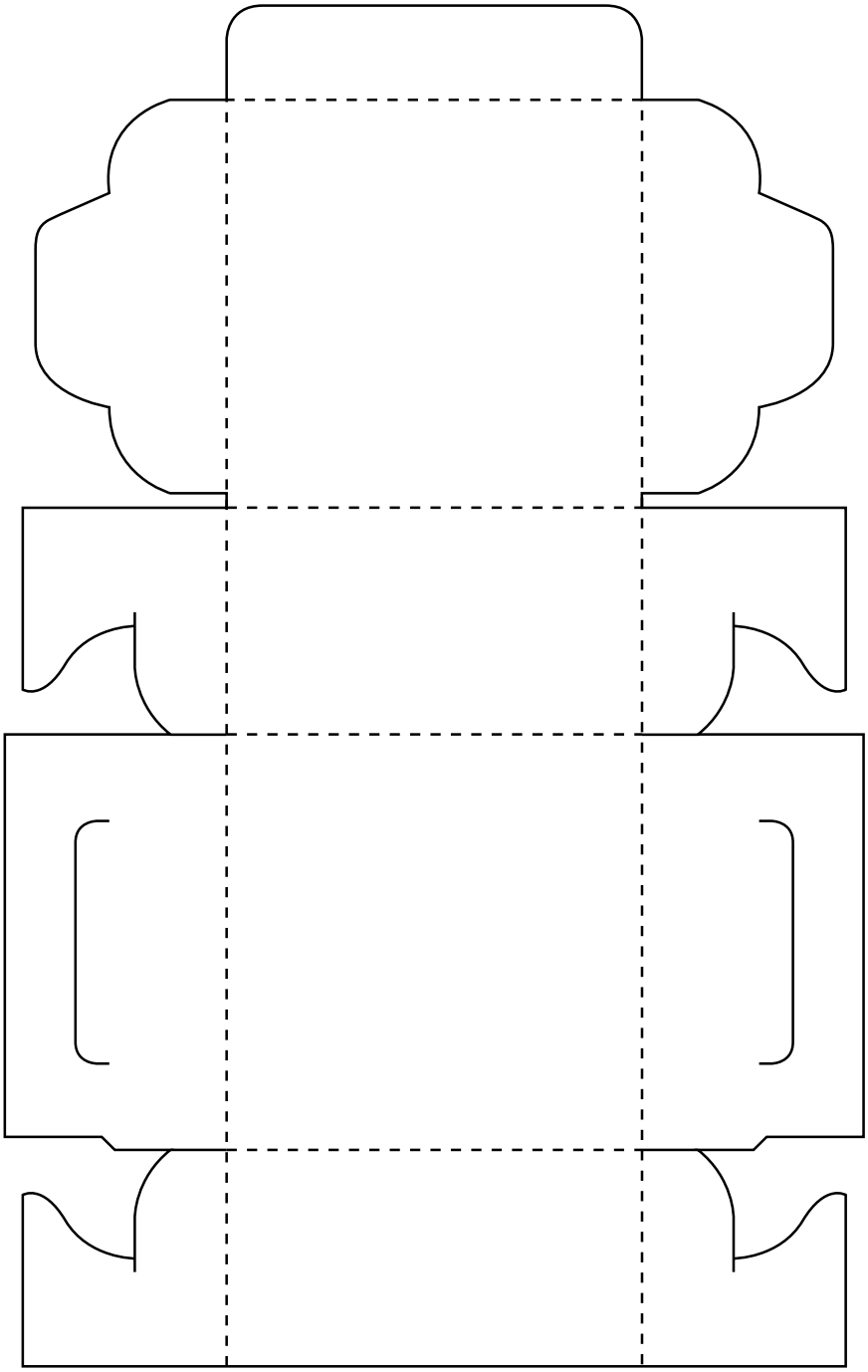


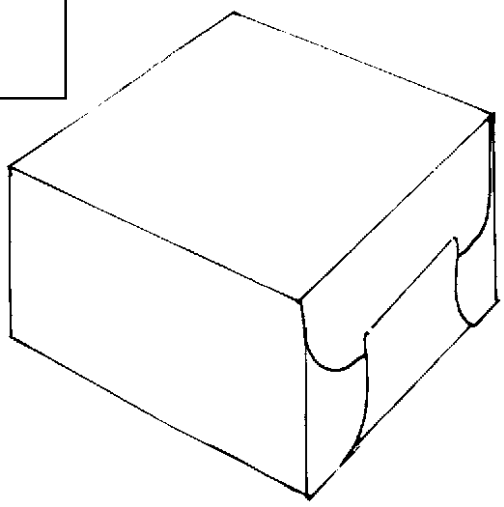
ONE-PIECE WRAP



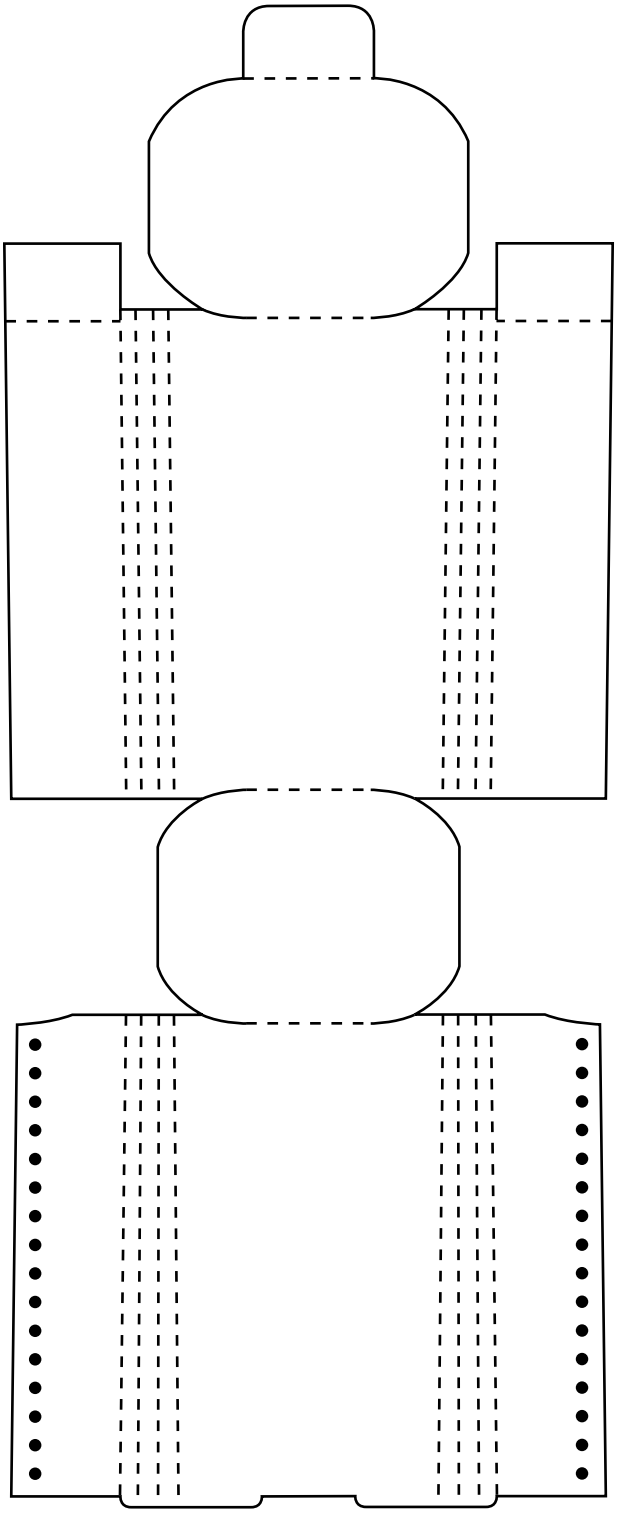


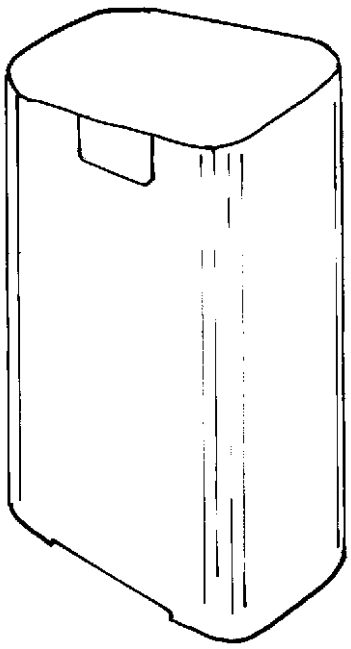
A rearrangement of the panels and glue flaps alters the appearance.

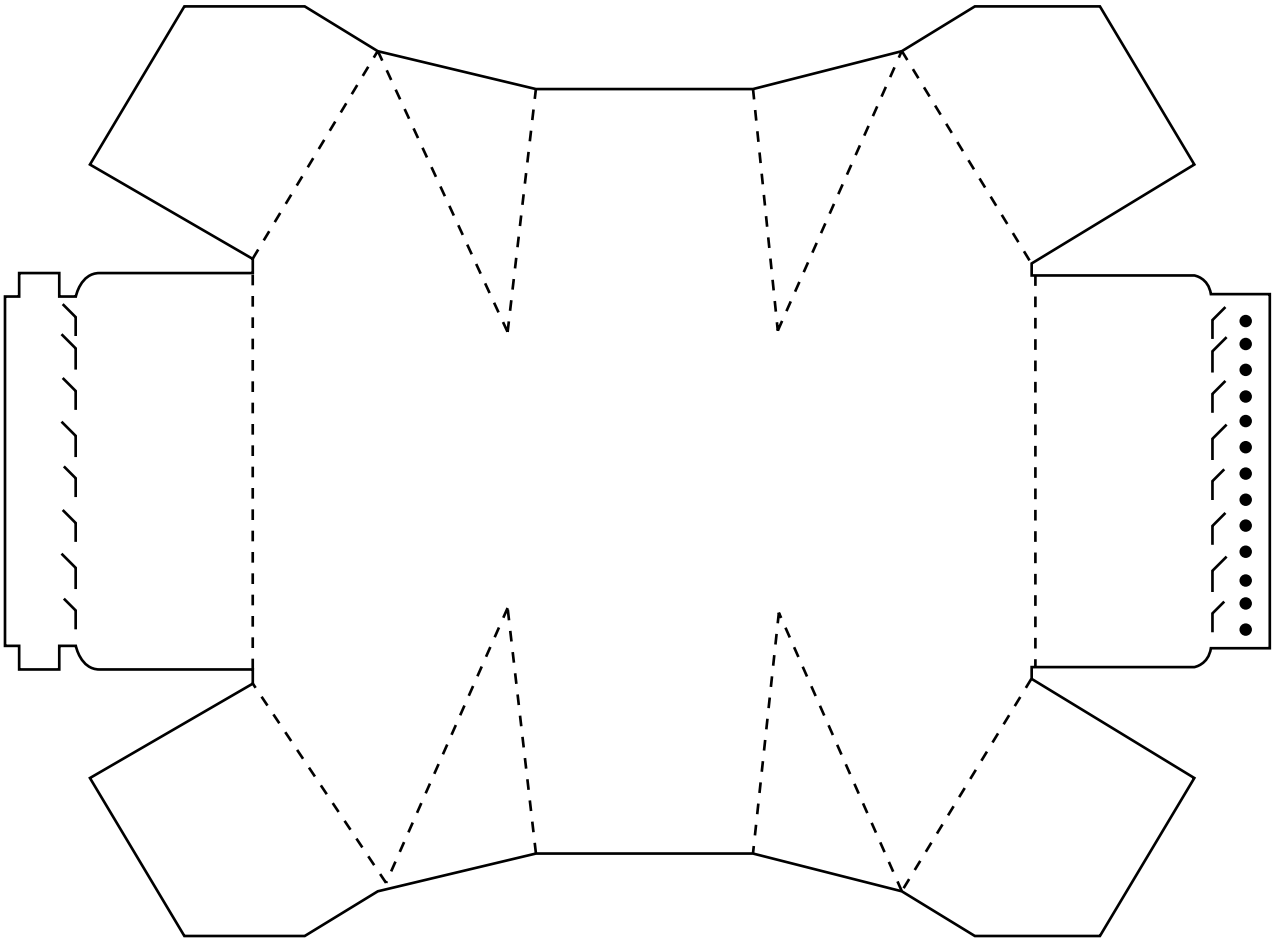


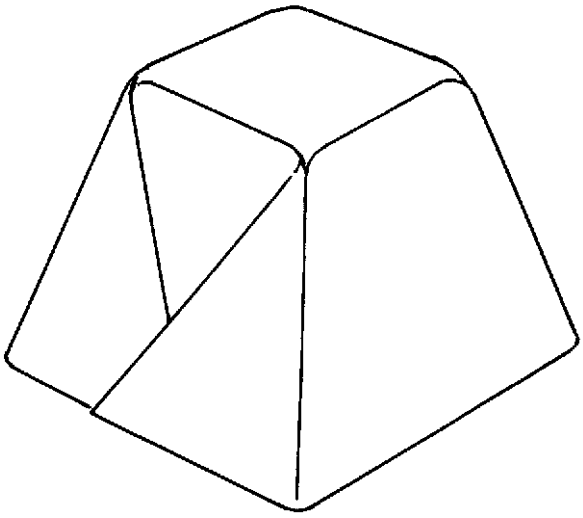


CANDY PACKAGE WITH ROUNDED CORNERS



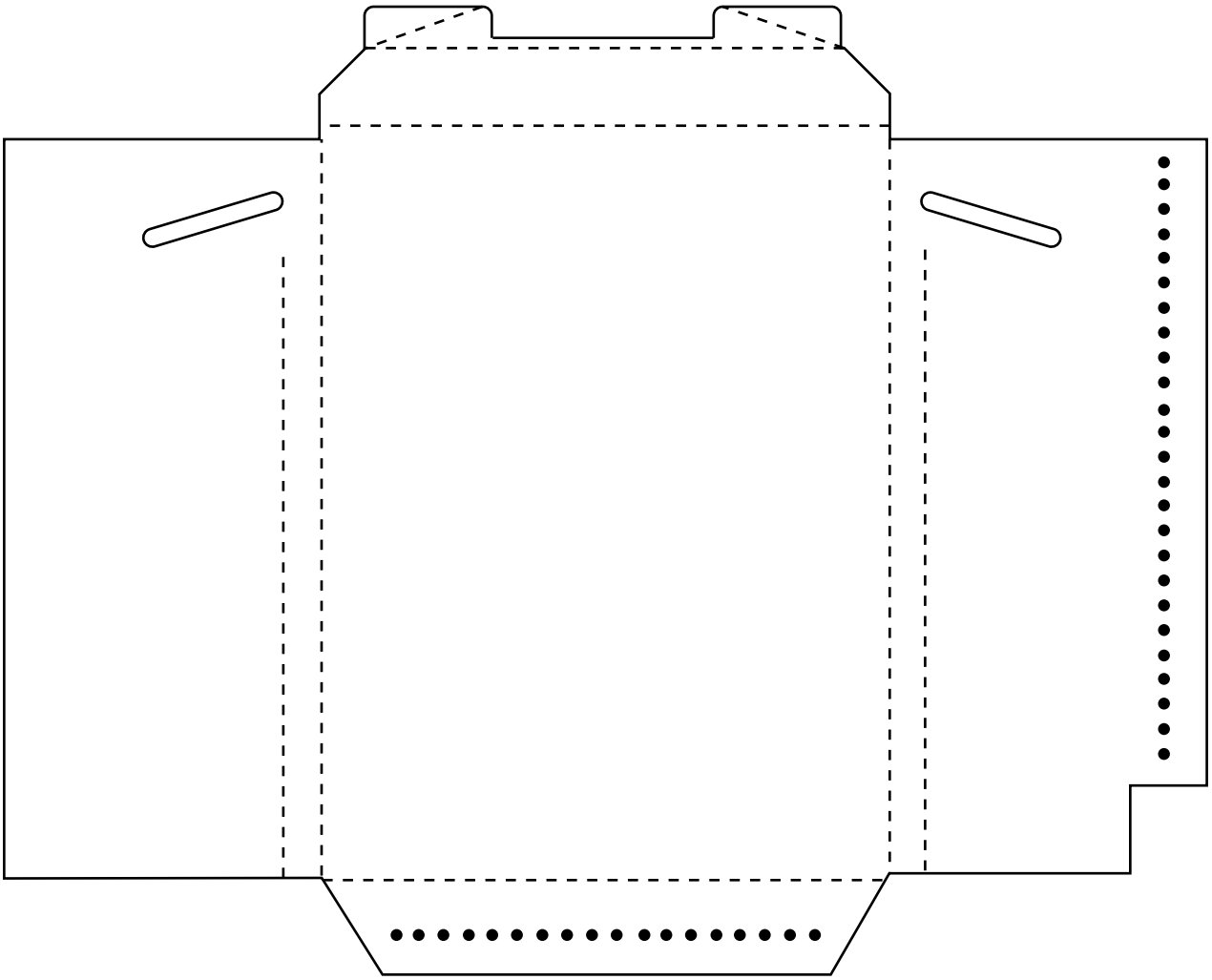


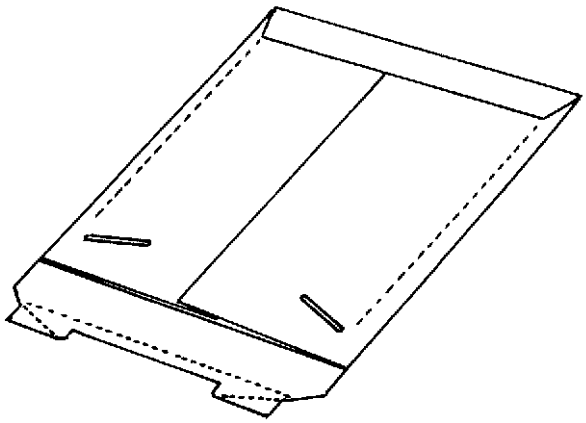




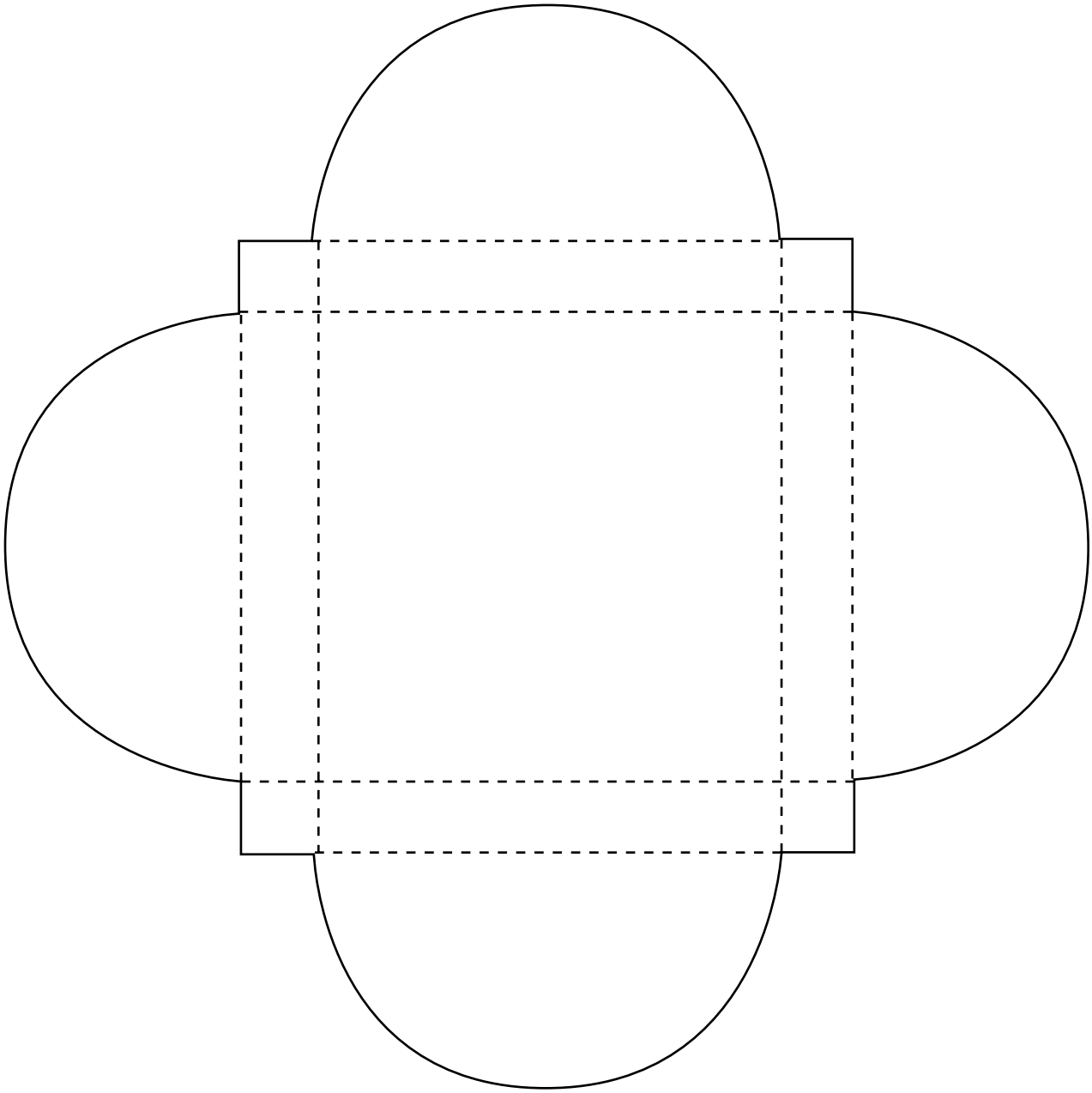
This fold-over wrap has been partially scored in order to create a soft, rounded top when assembled.

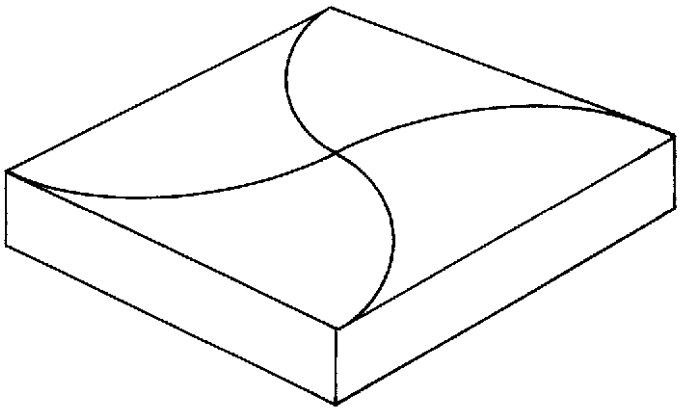
HEAVY-DUTY FOLDER IWTH LOCK TABS AND EXPANDABLE SIDES



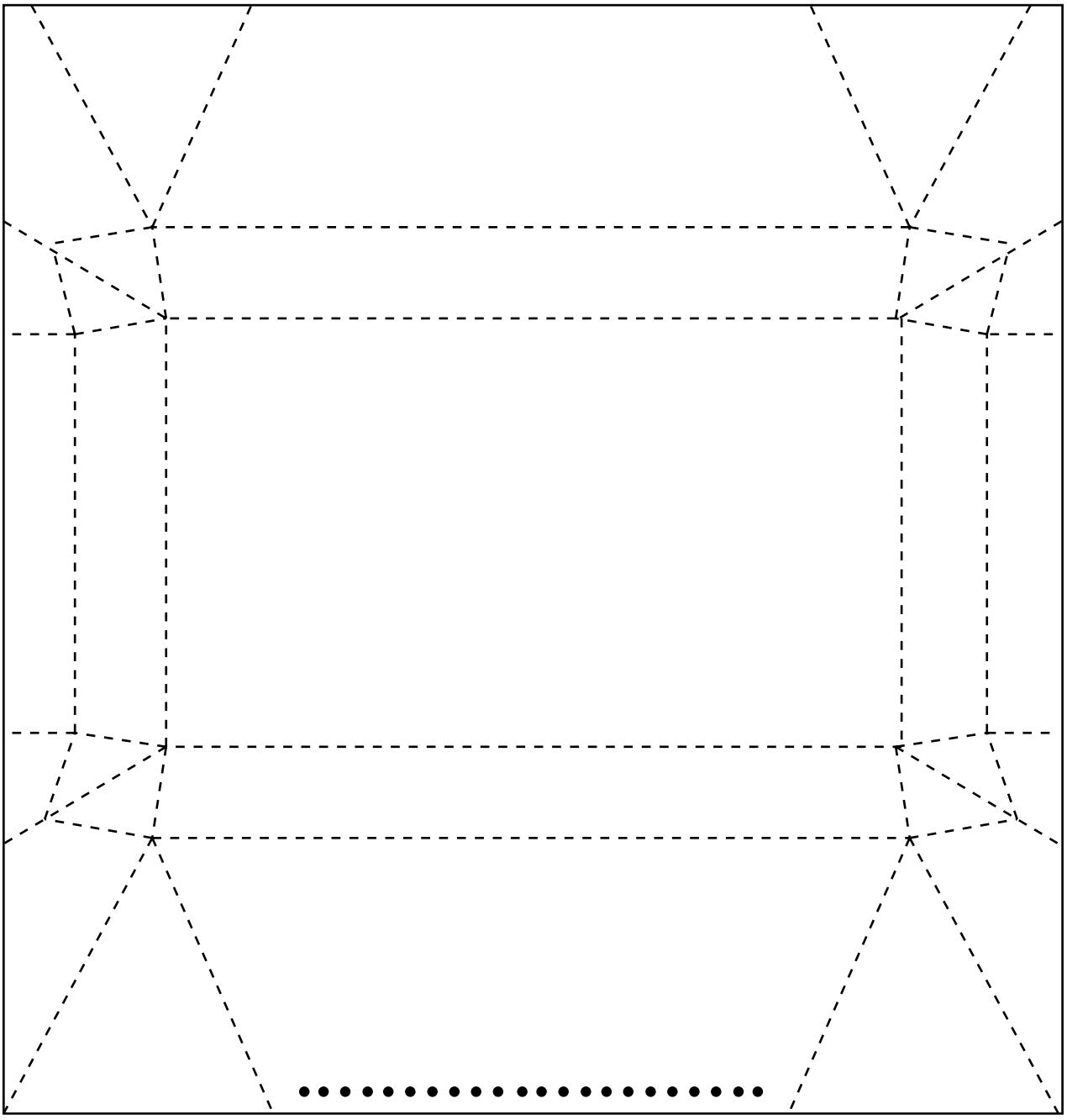


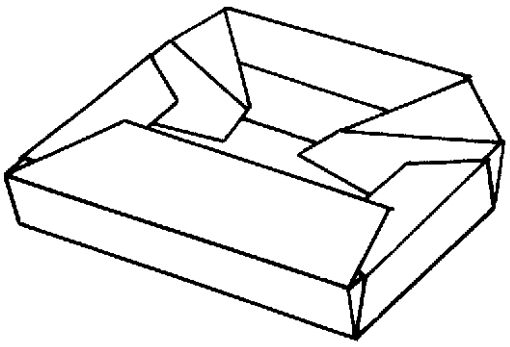
GIFT WRAP WITH INTERLOCKING COVER



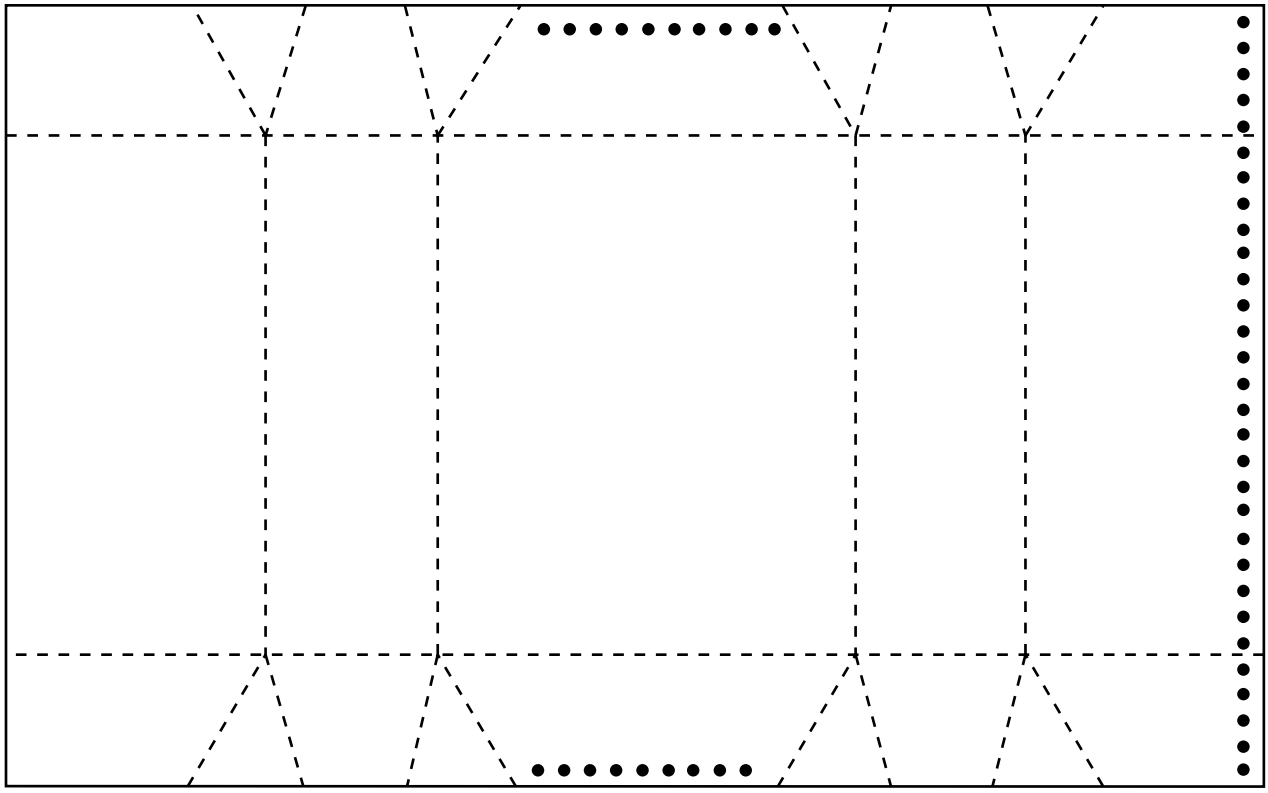


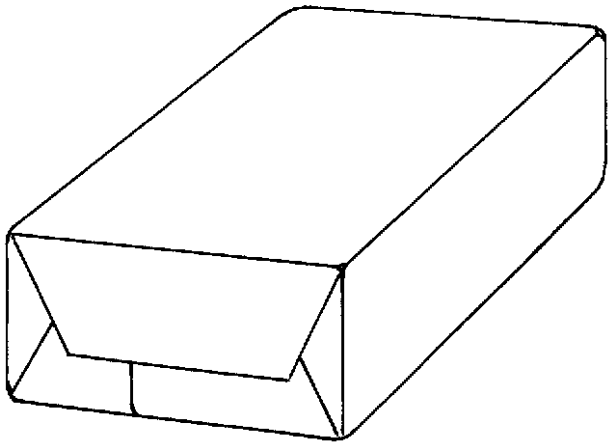
TYPICAL WRAP FOR CHOCOLATE BAR



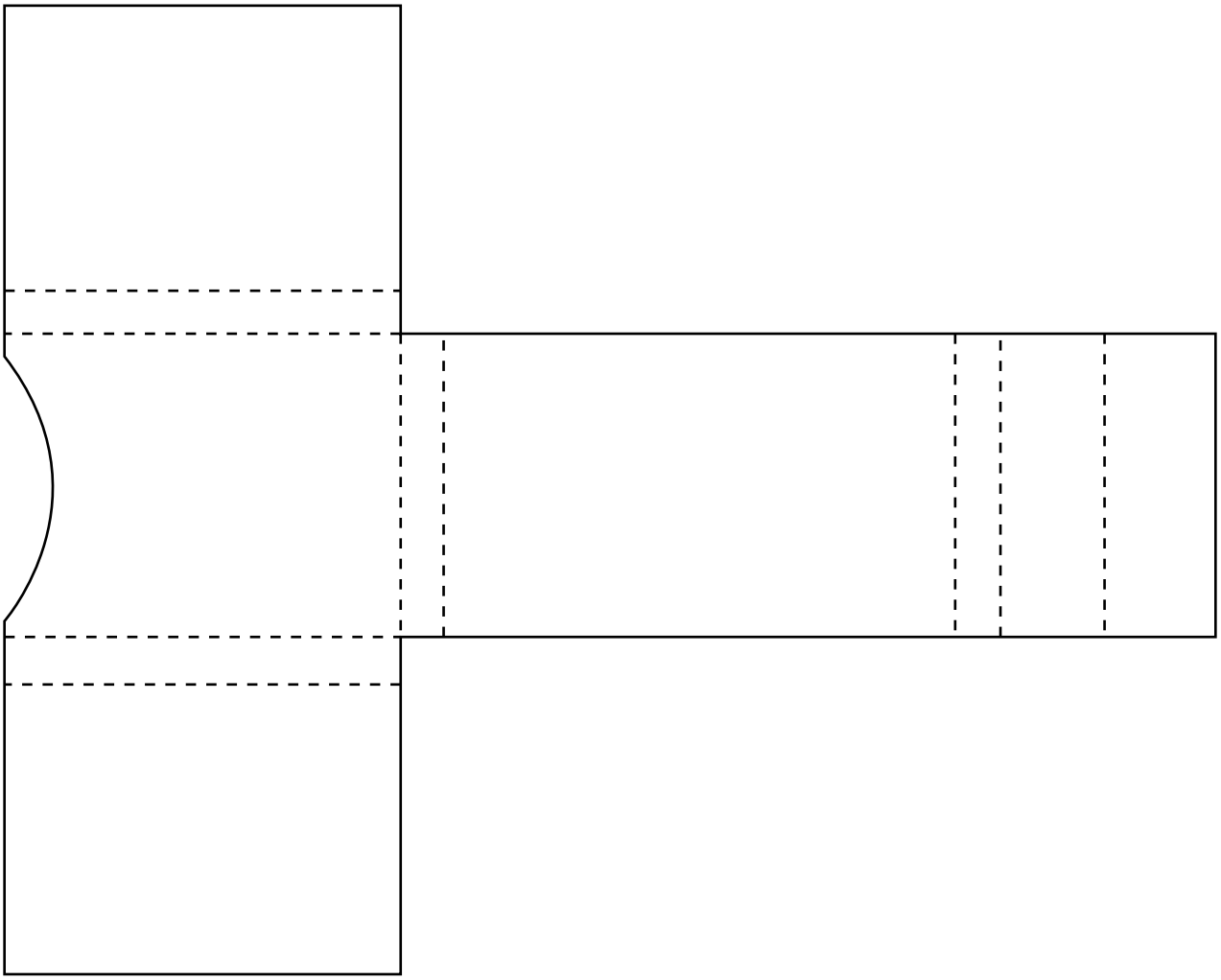


LAYOUT FOR SOAP BAR WRAP

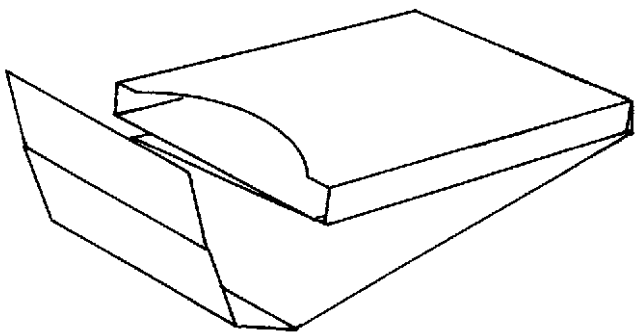


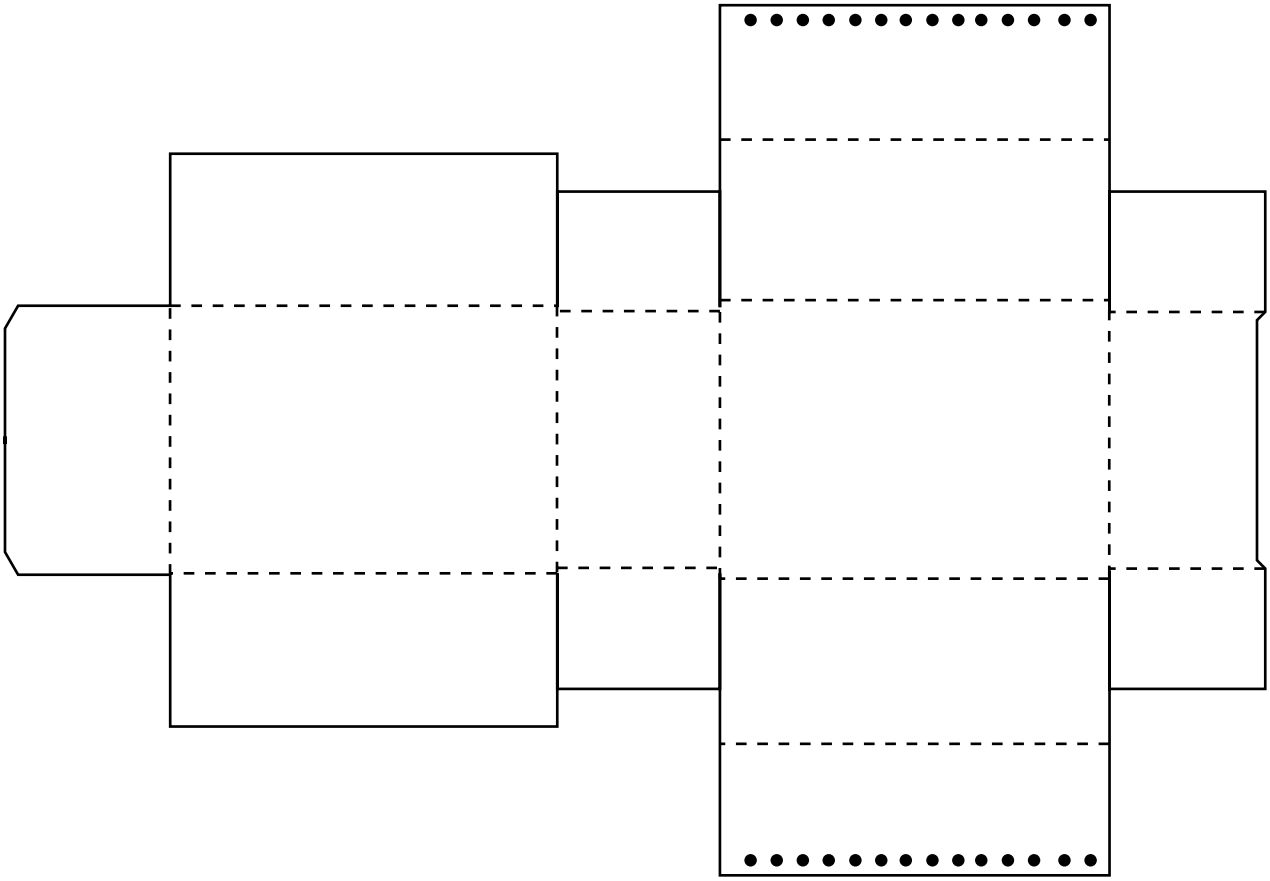


ONE-PIECE FOLDER

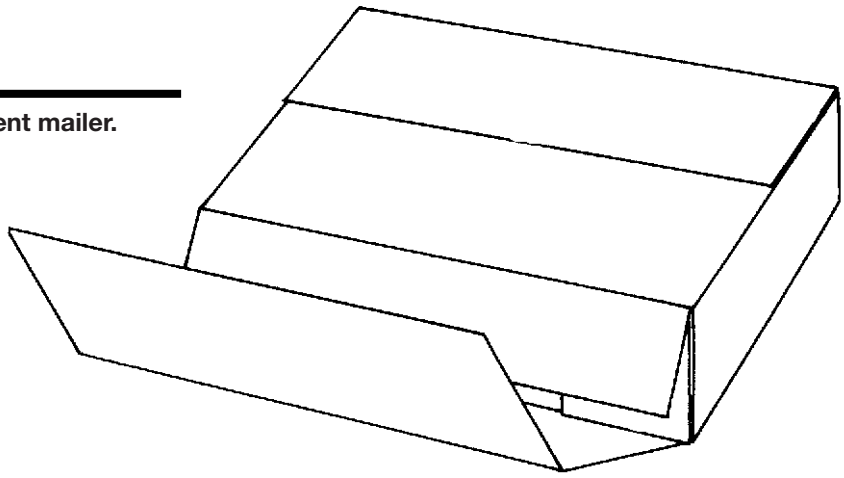


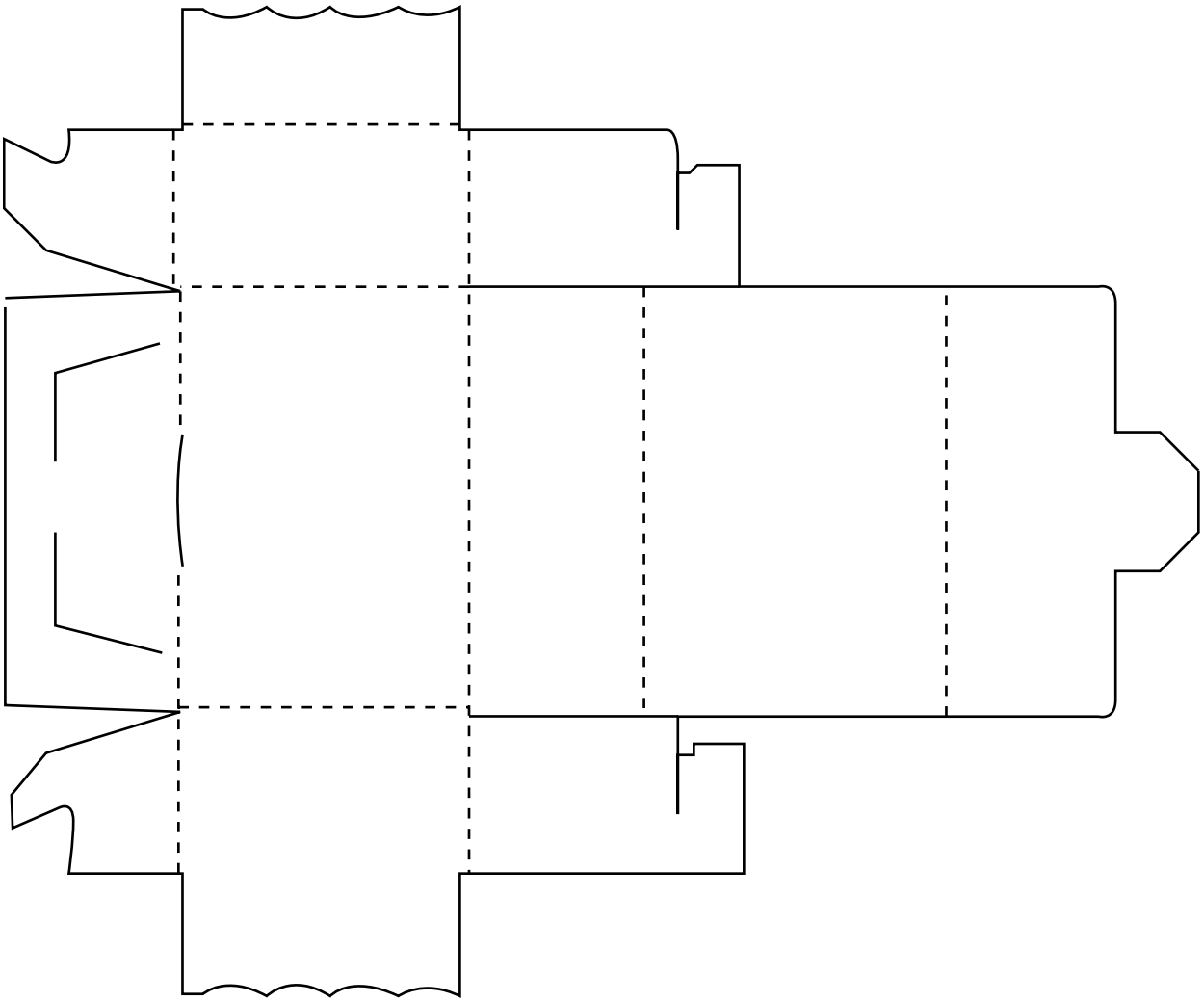
Suitable for cards as well as haberdashery items.



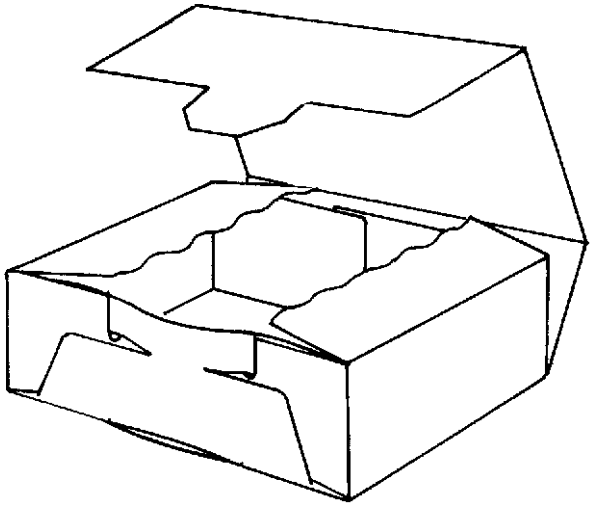


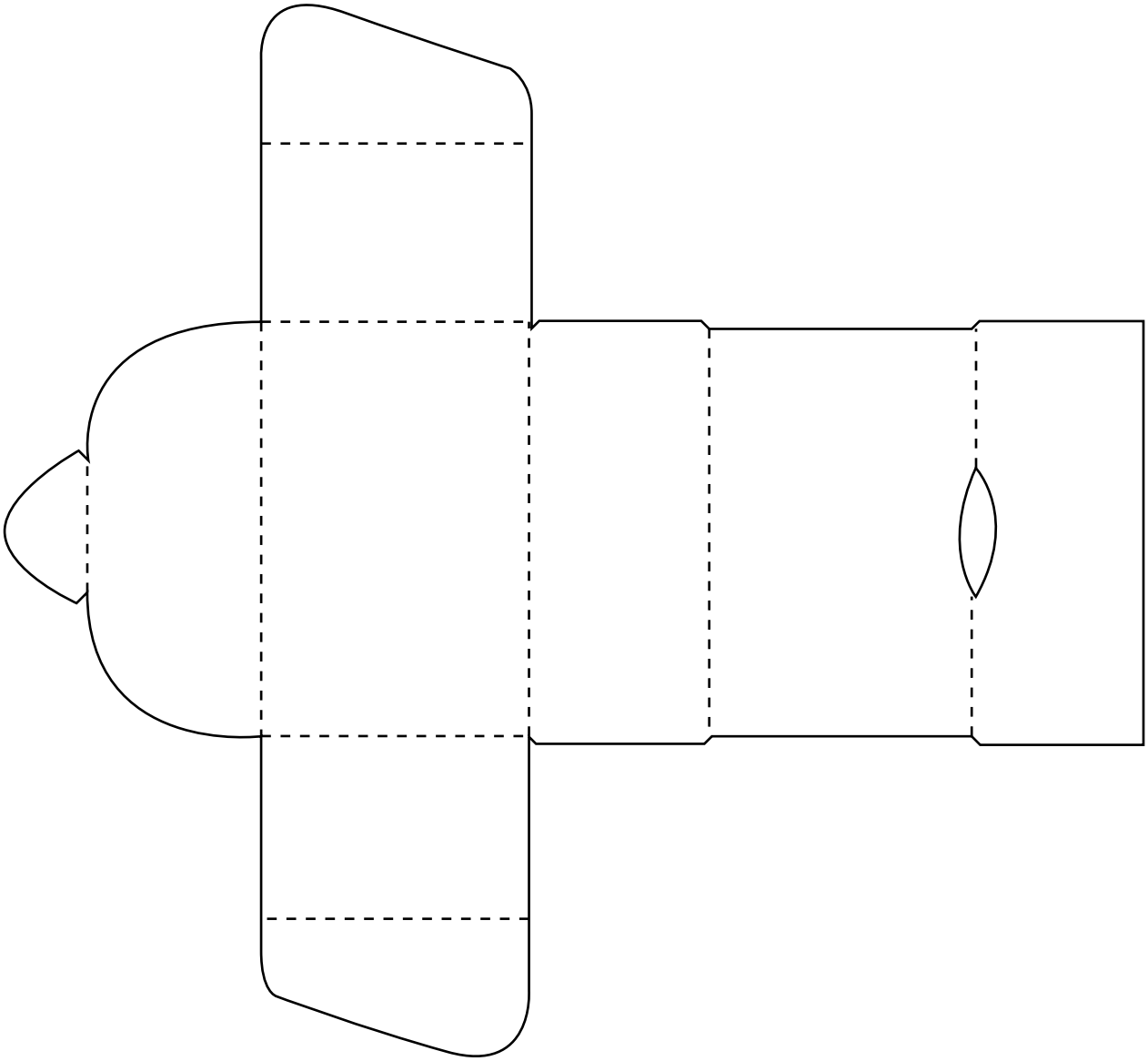
When taped shut, it makes an excellent mailer.

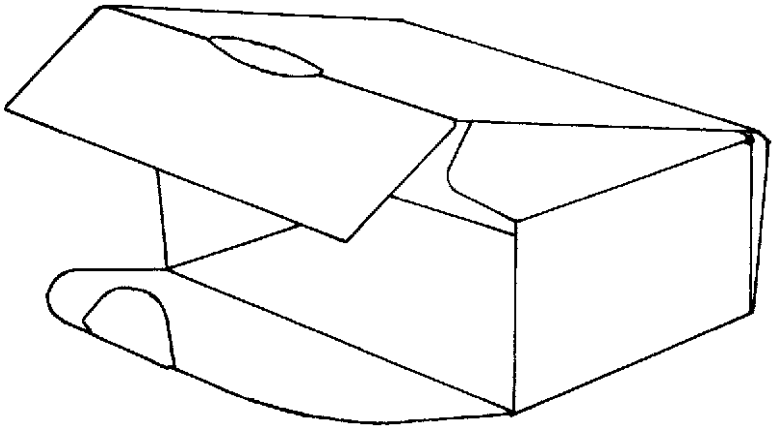




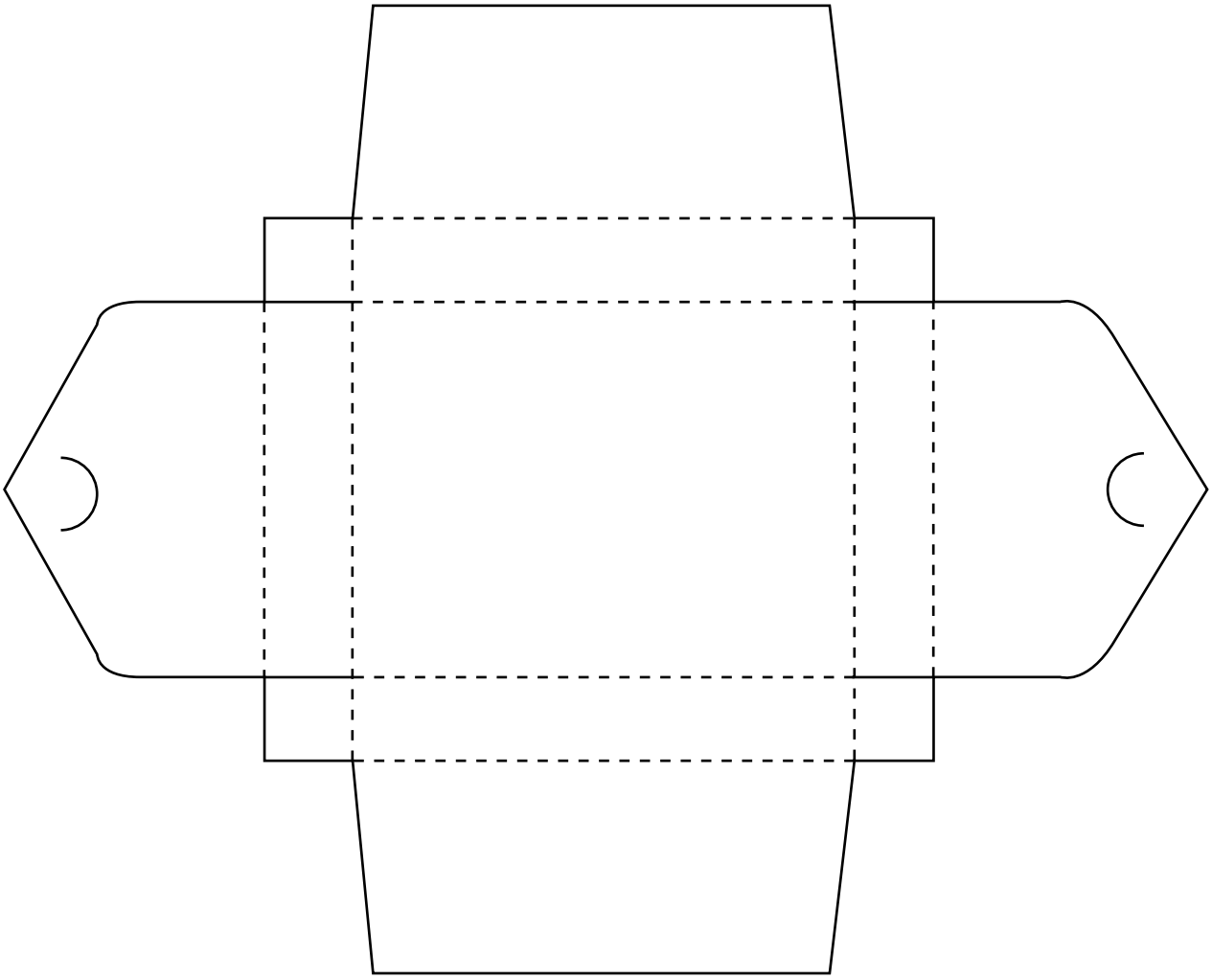
This box with Arthur locks and hook locks needs no glue. It makes an excellent container for jewelry items.

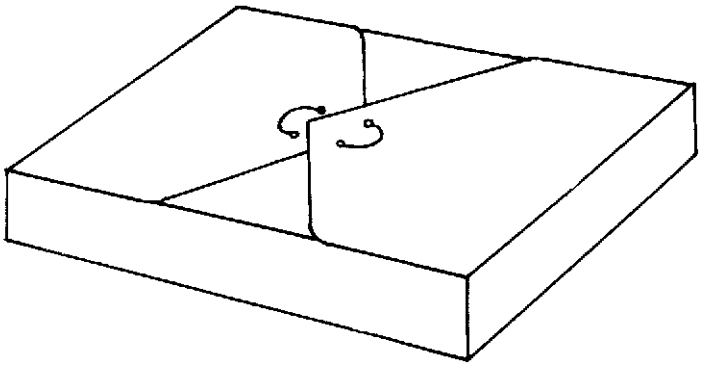


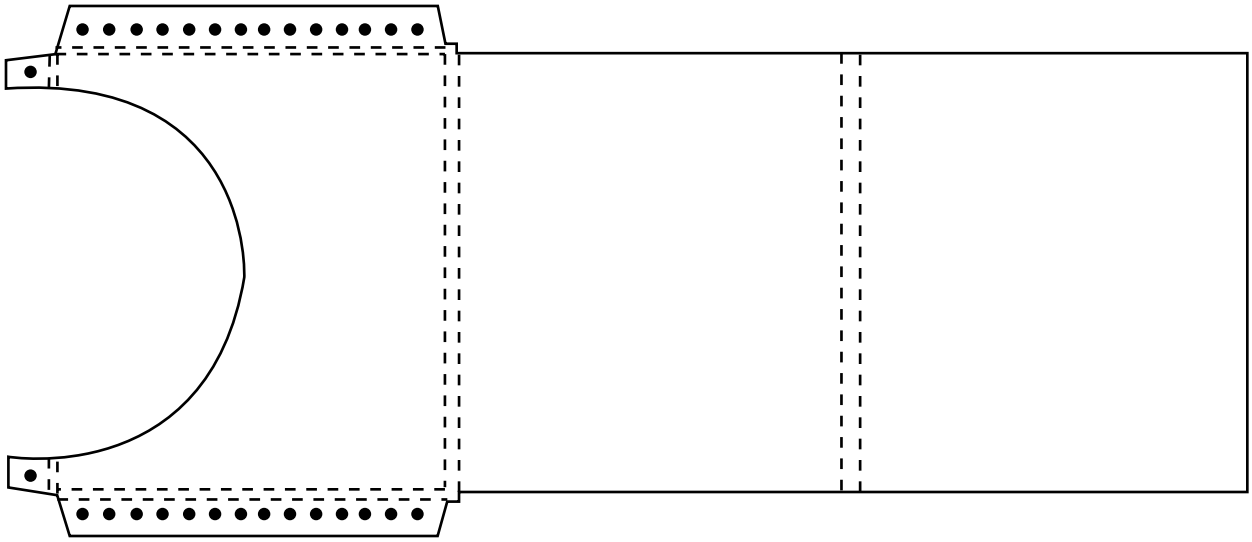




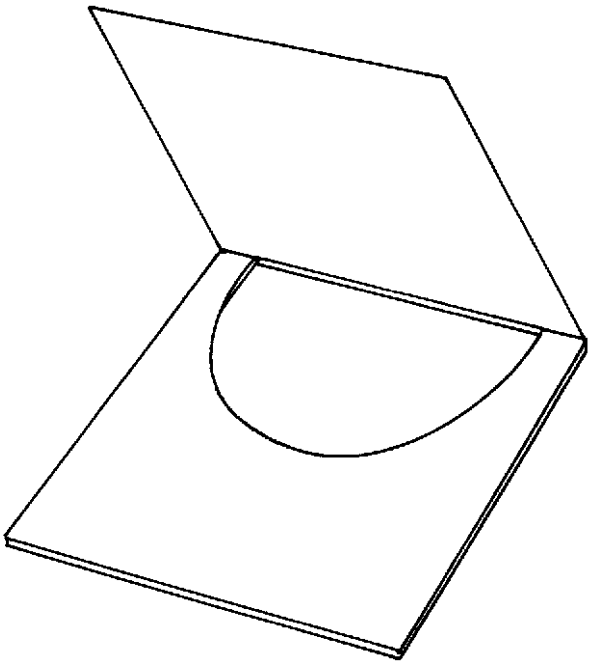
FOLDER WITH HOOKS FOR STRING OR ELASTIC-BAND CLOSURE



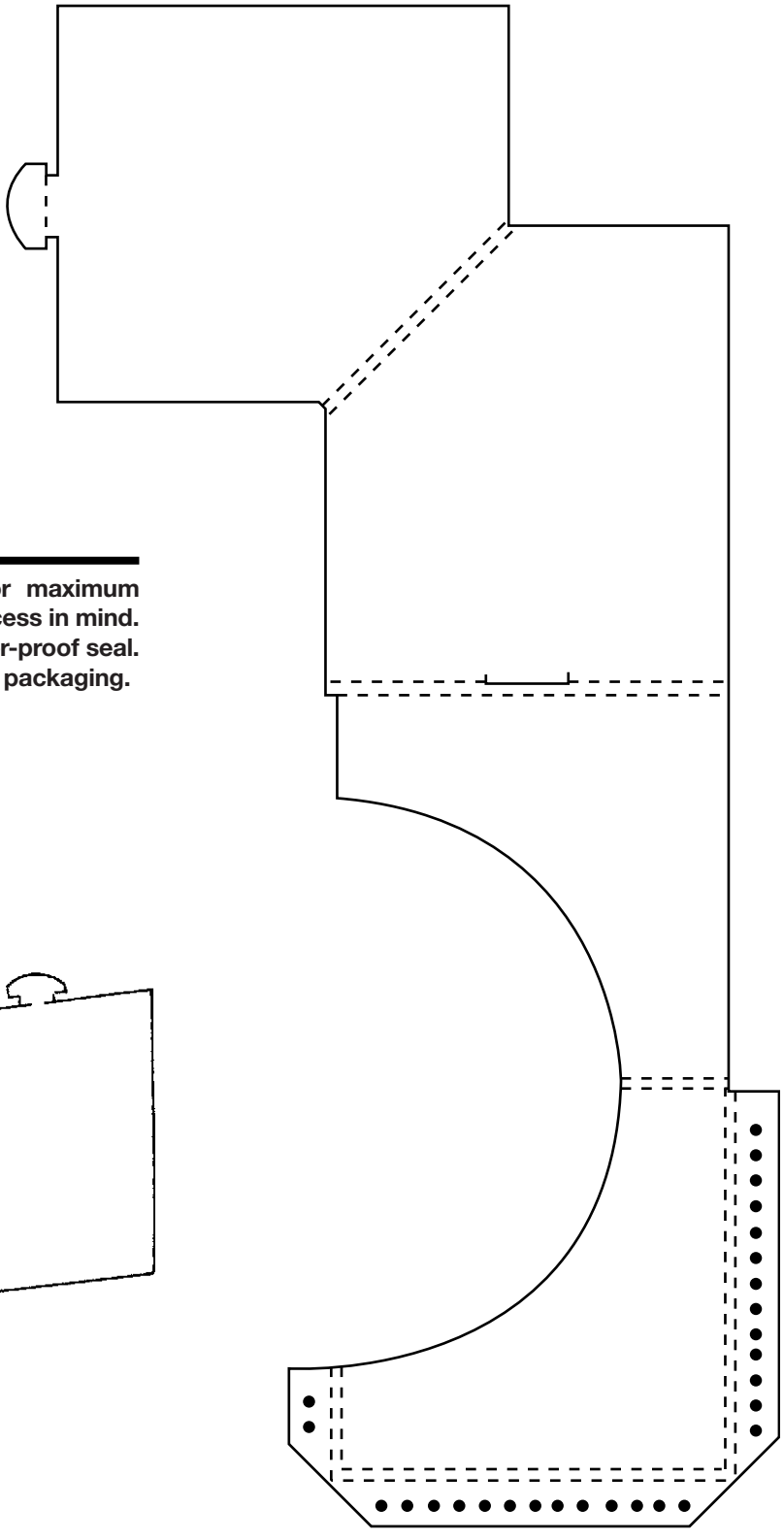




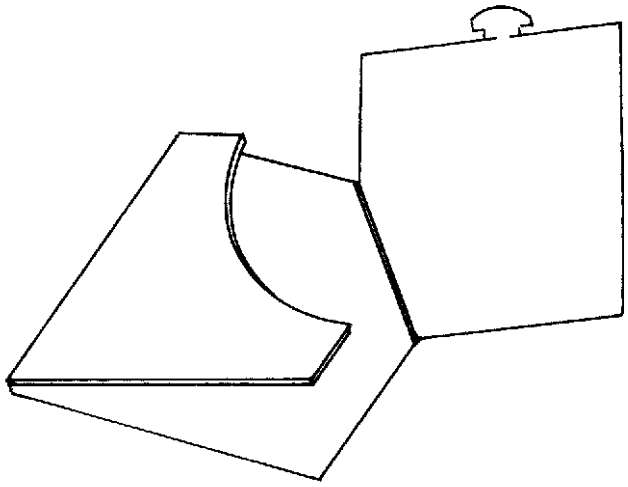
A simple, economical, one-piece compact disc folder with good product protection, easy product access, and sufficient printing surface for product information.

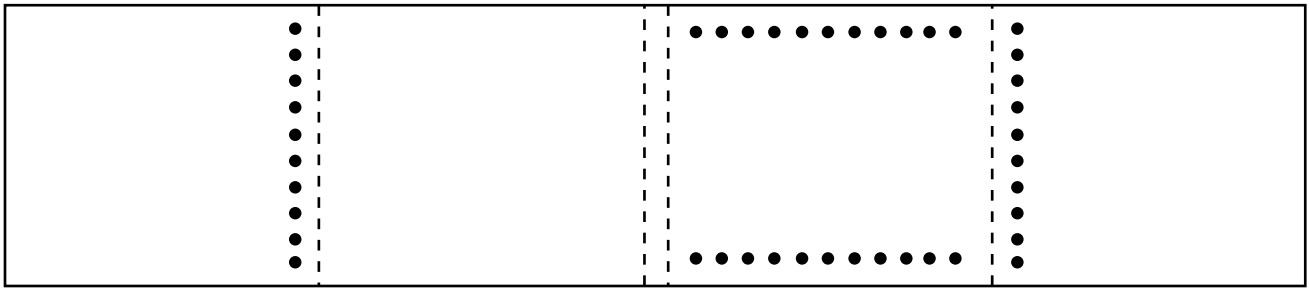


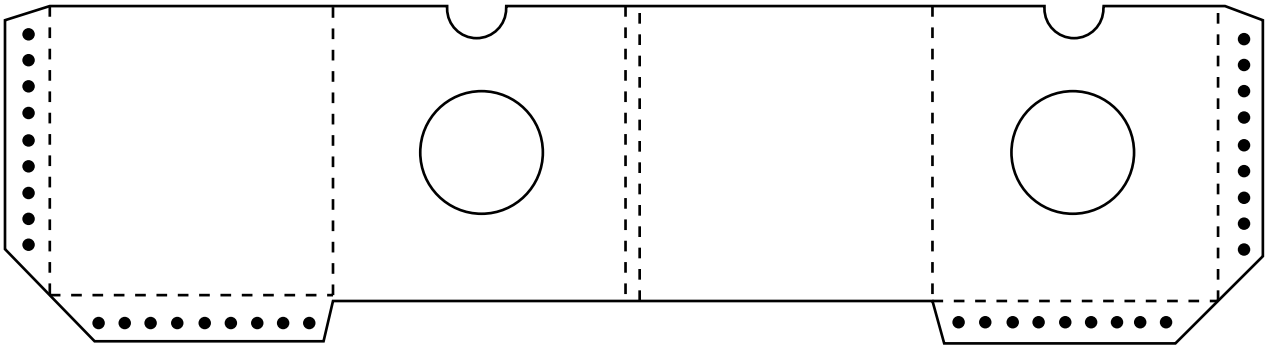
COMPACT DISC SLEEVE

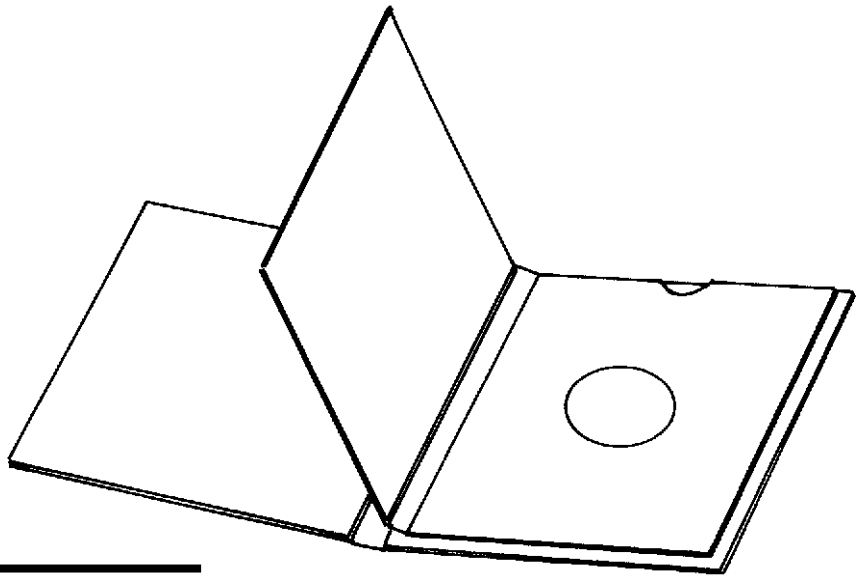


I designed this one-piece package for maximum product protection and easy product access in mind. The lock tab can be sealed with a tamper-proof seal. The overall size conforms to existing CD packaging.



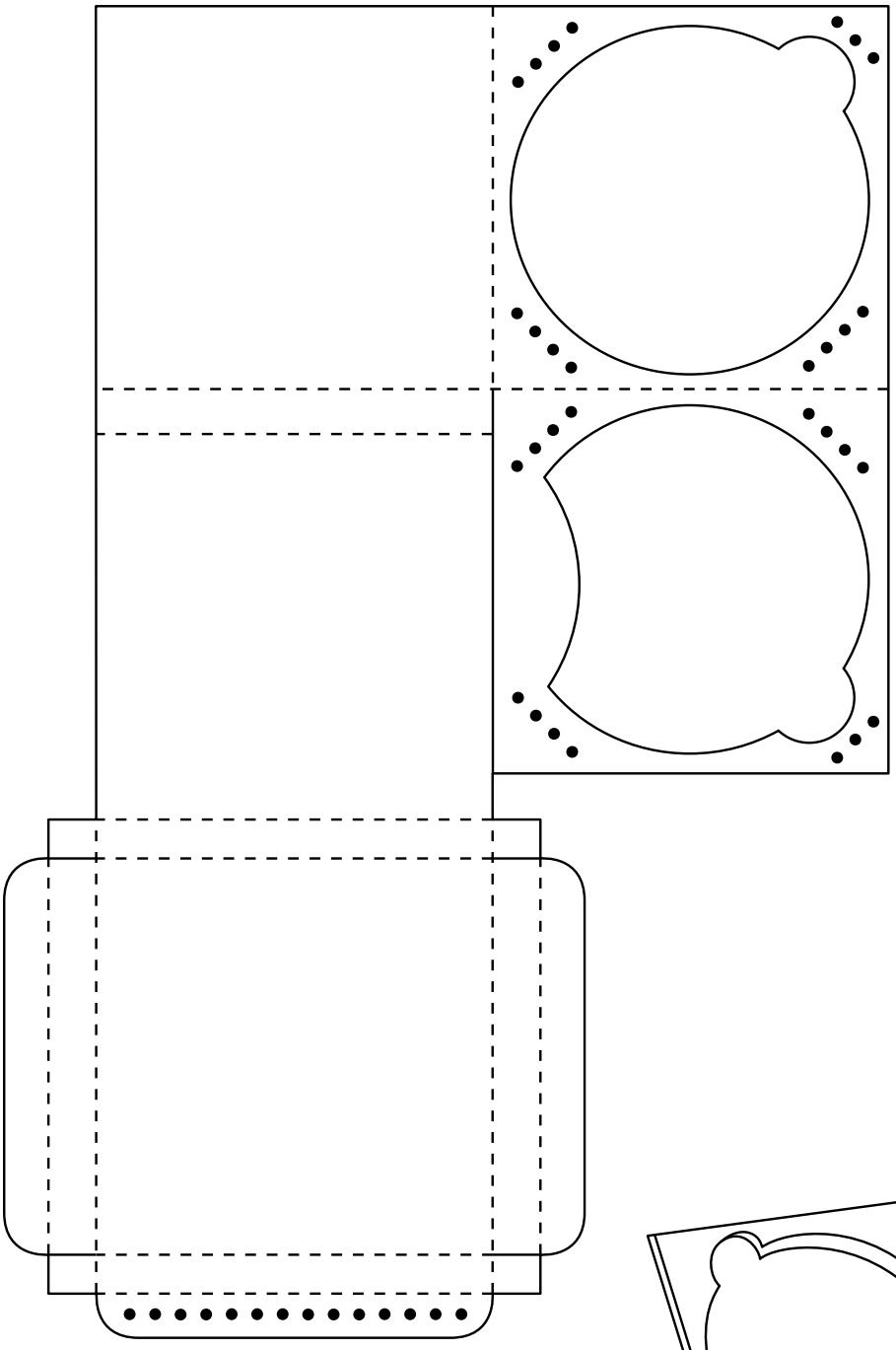


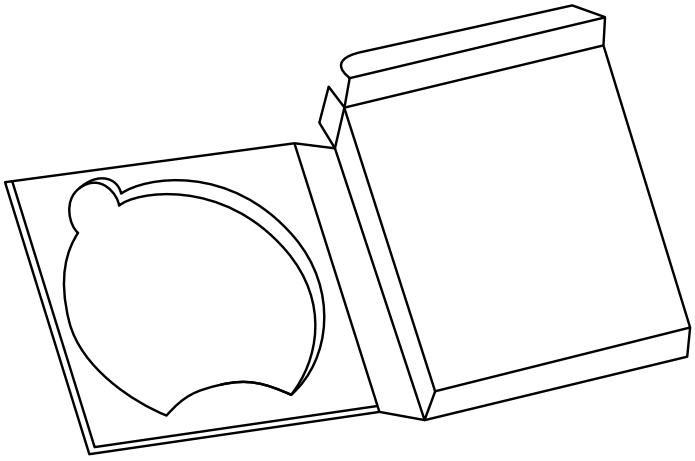


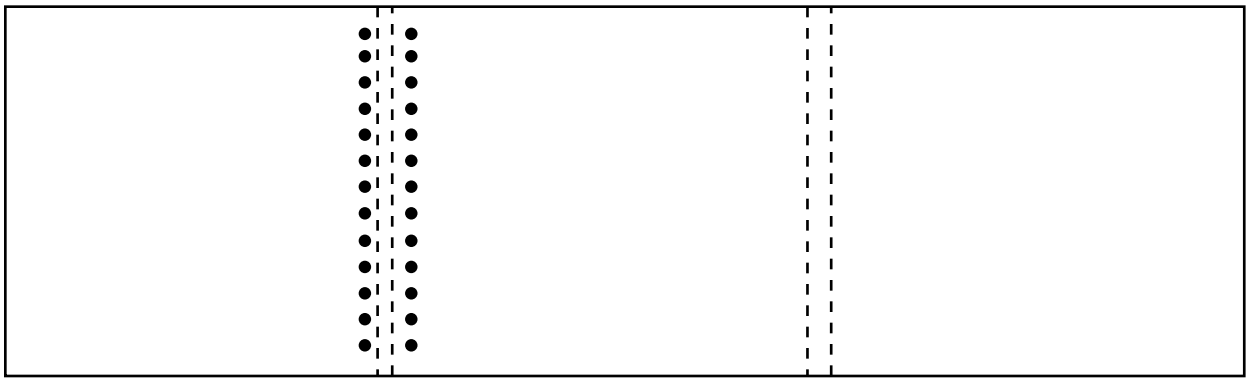


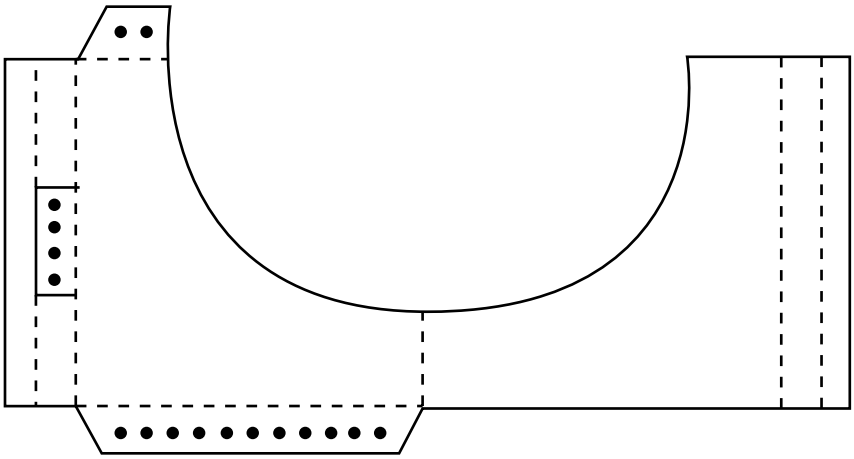
Two-piece 2 CD sleeve based on the old vinyl gramophone record packaging.

CD/DVD DISC HOLDER WITH INSTRUCTION MANUAL SPACE

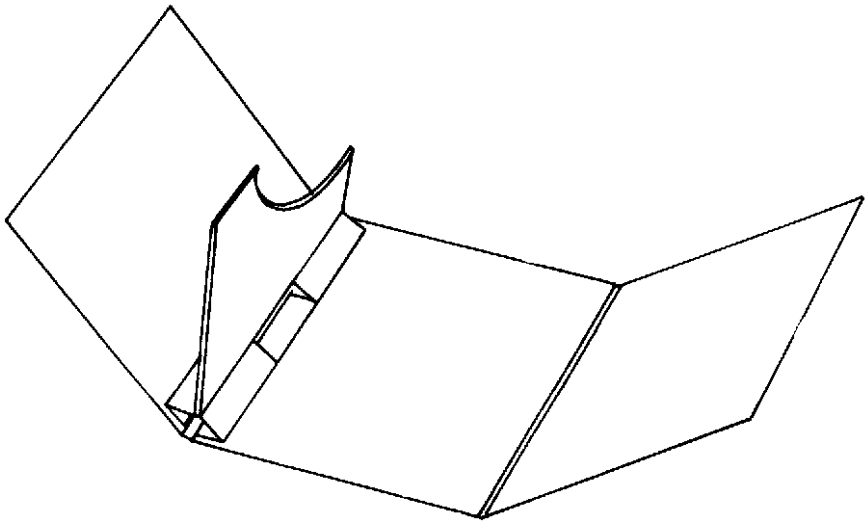


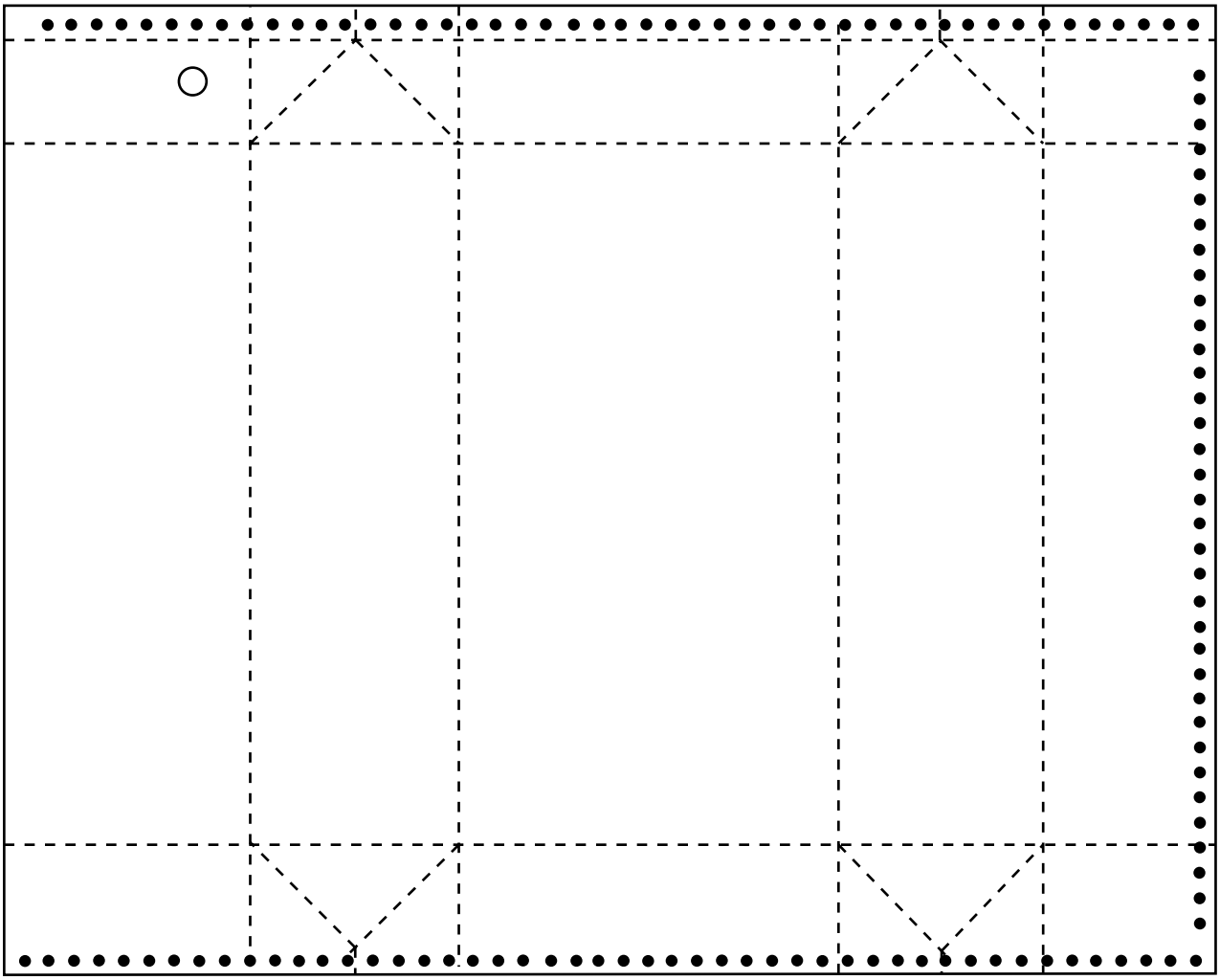




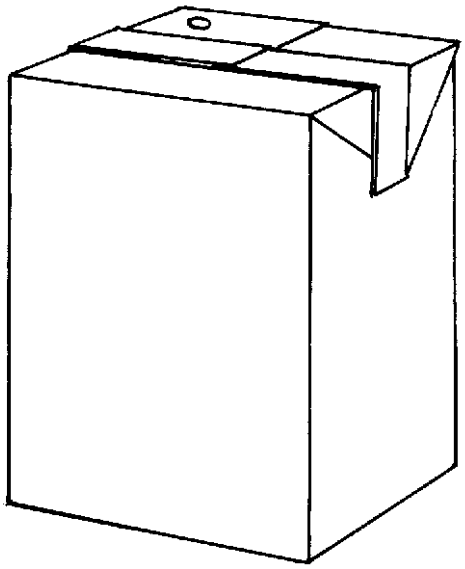


This GW compact disc folder pops up when the outer sleeve is opened. The CD may be accessed by its spindle hole, thus avoiding contact with grooves.

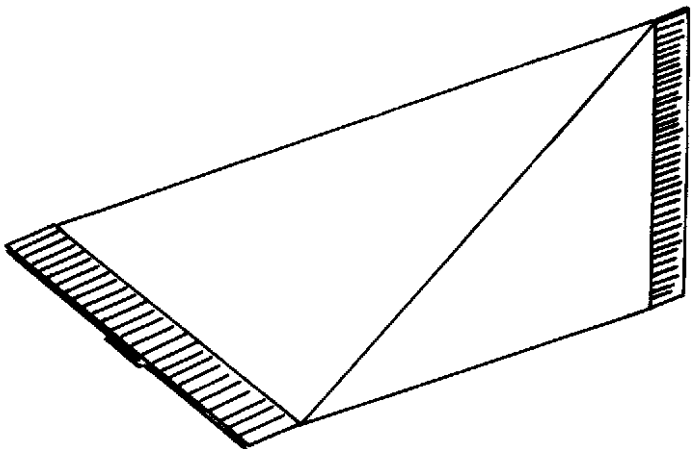


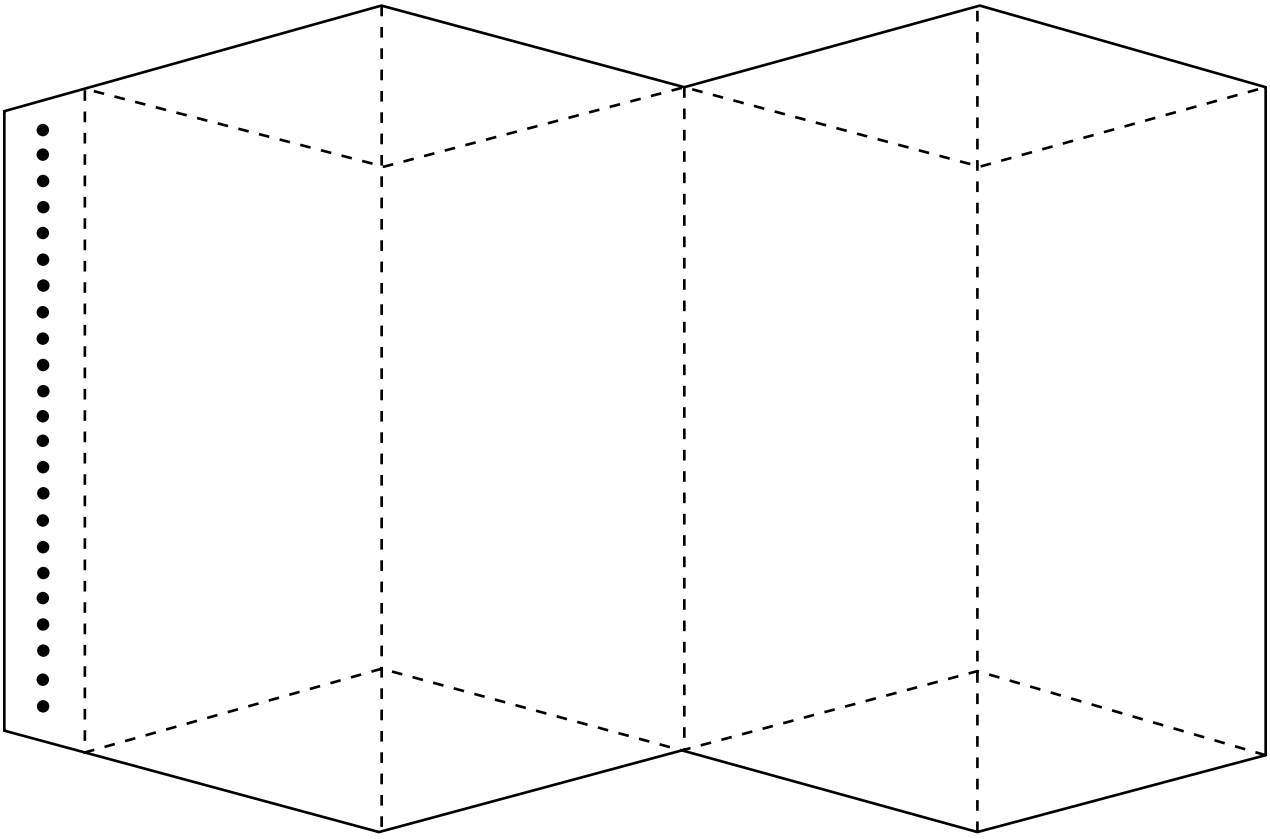


The package is formed and sterilized around the product.

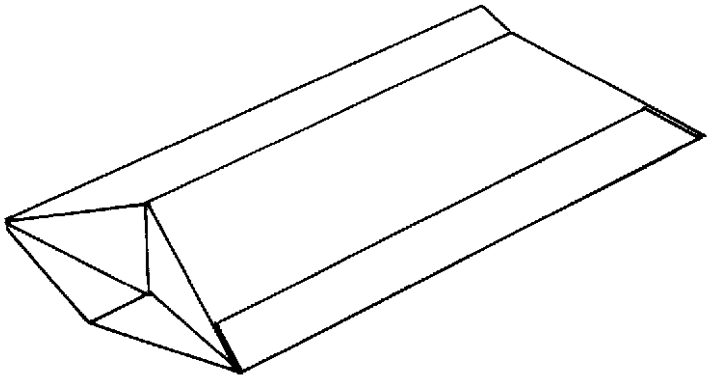


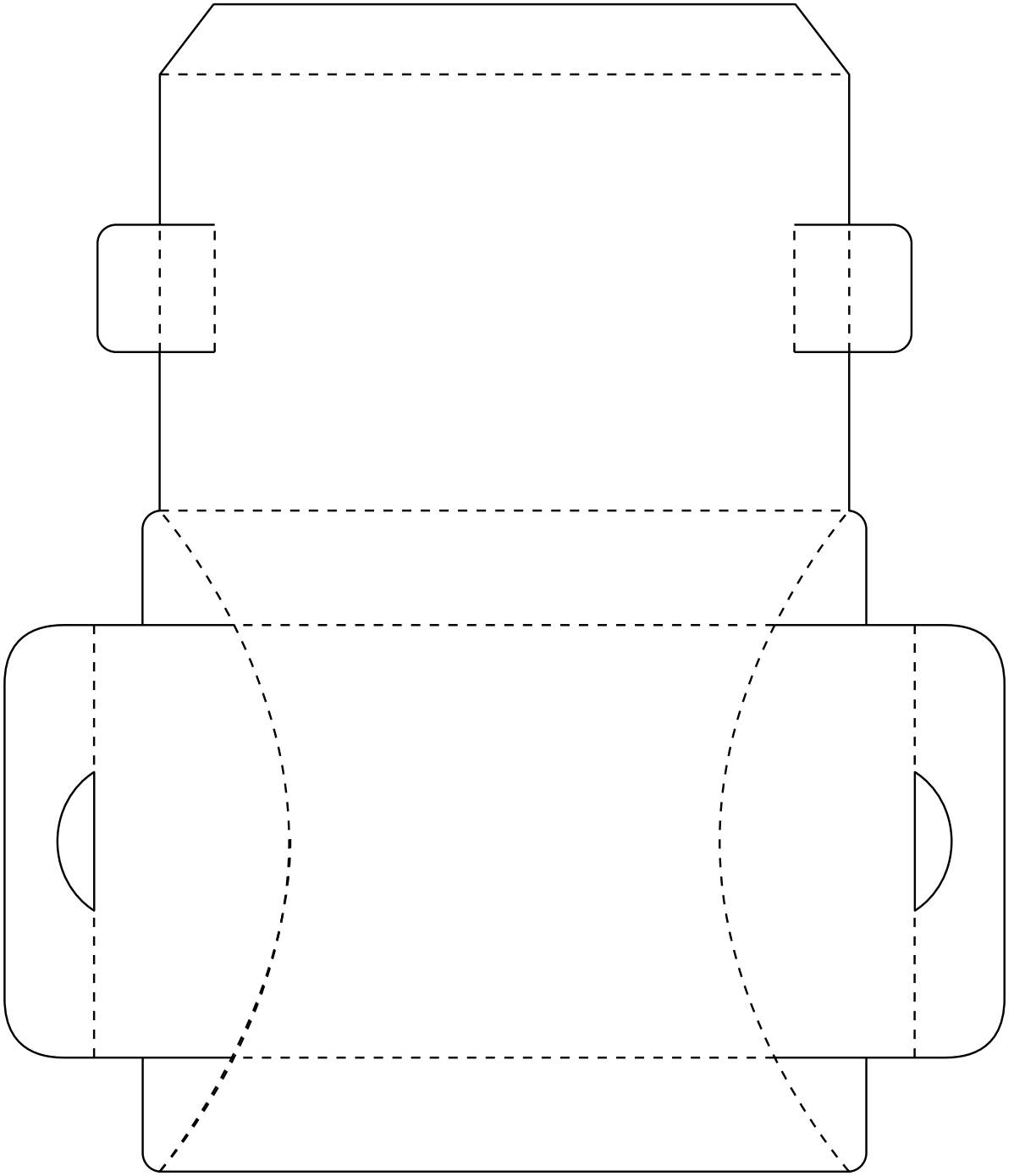
Also suitable for novelty items, hosiery, etc.

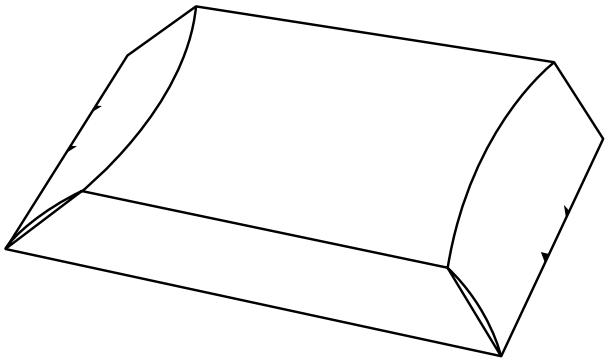




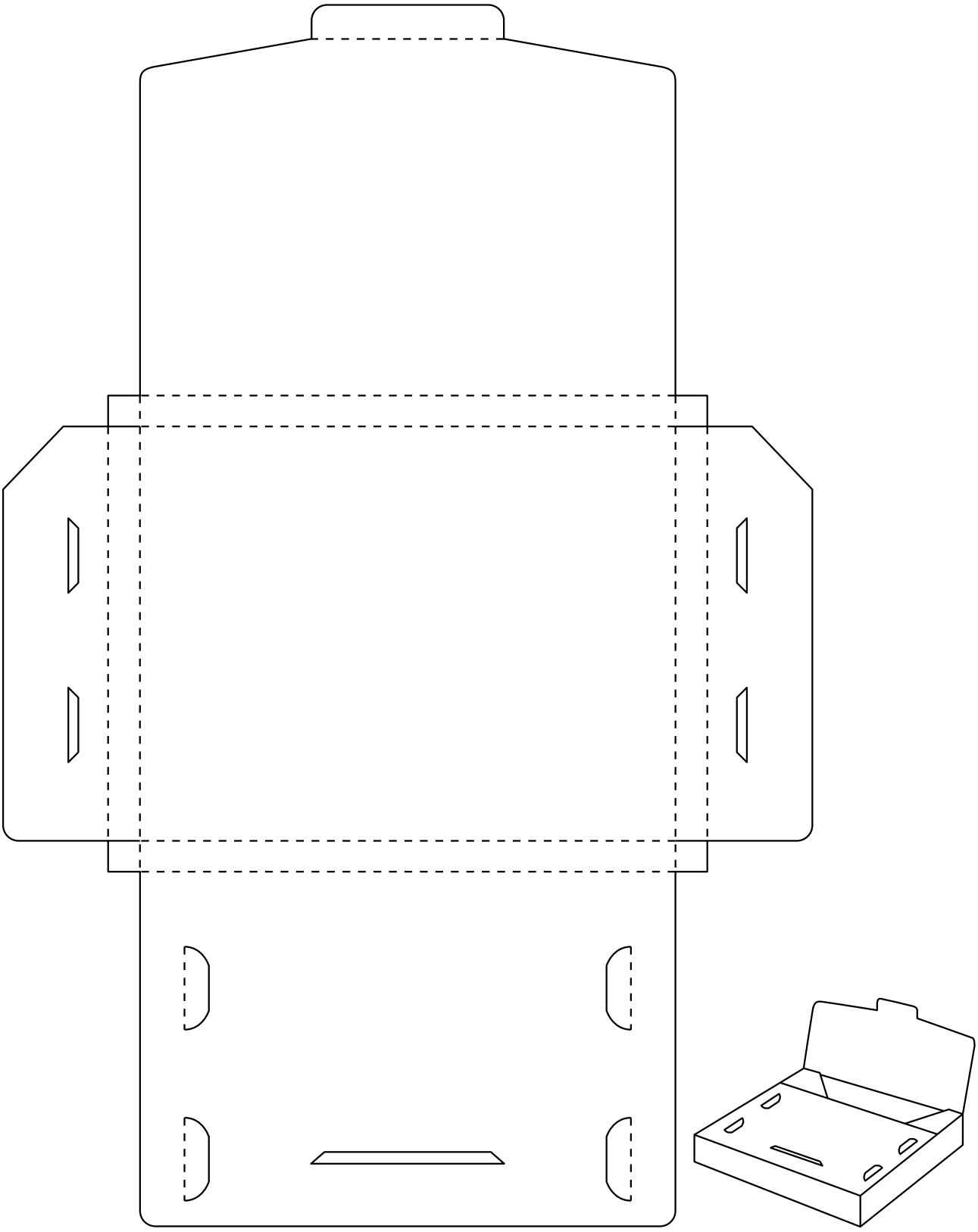
The end closures snap in.

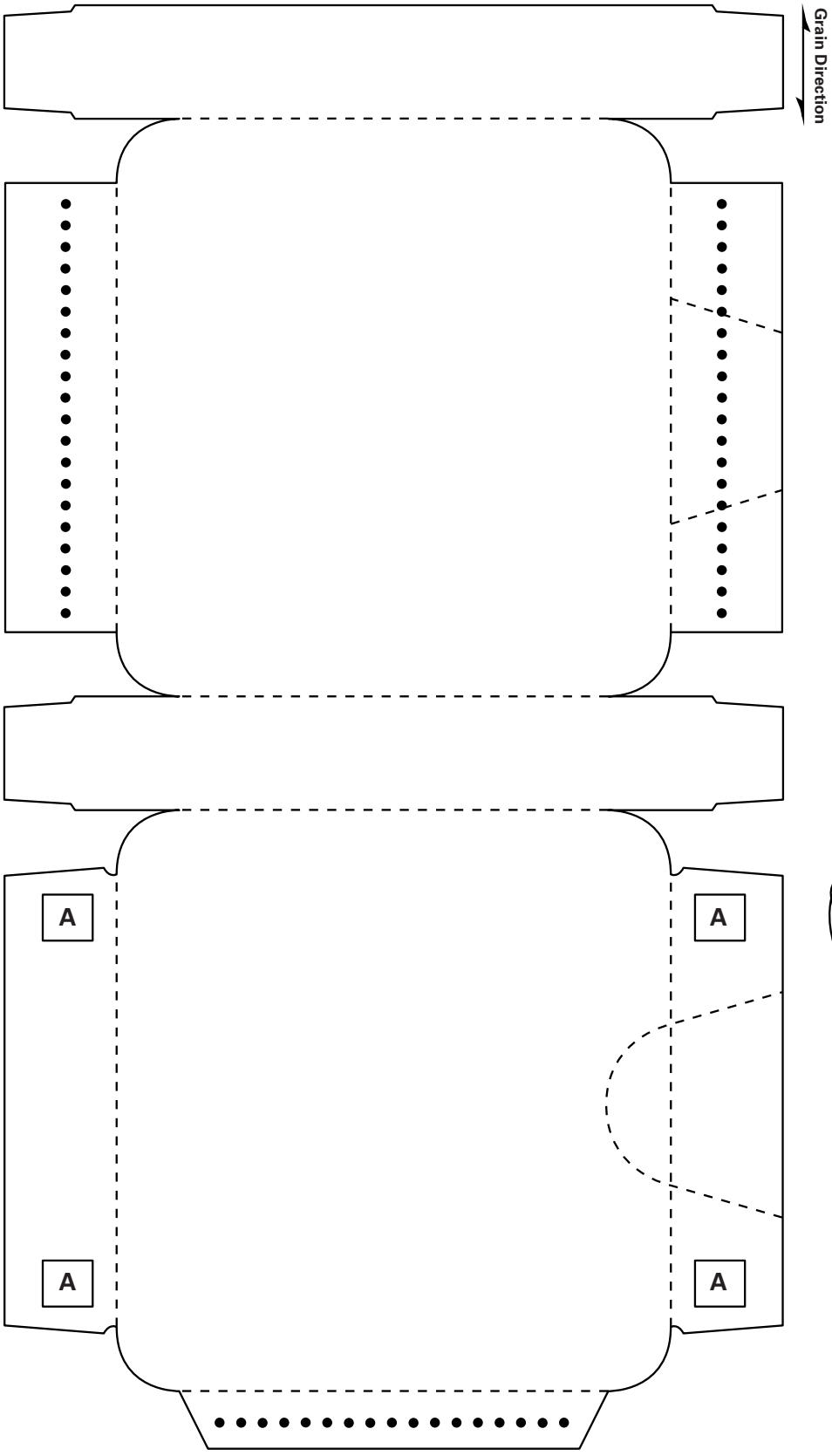


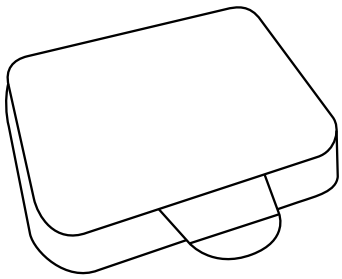




FOLD-OVER WITH LOCK TABS

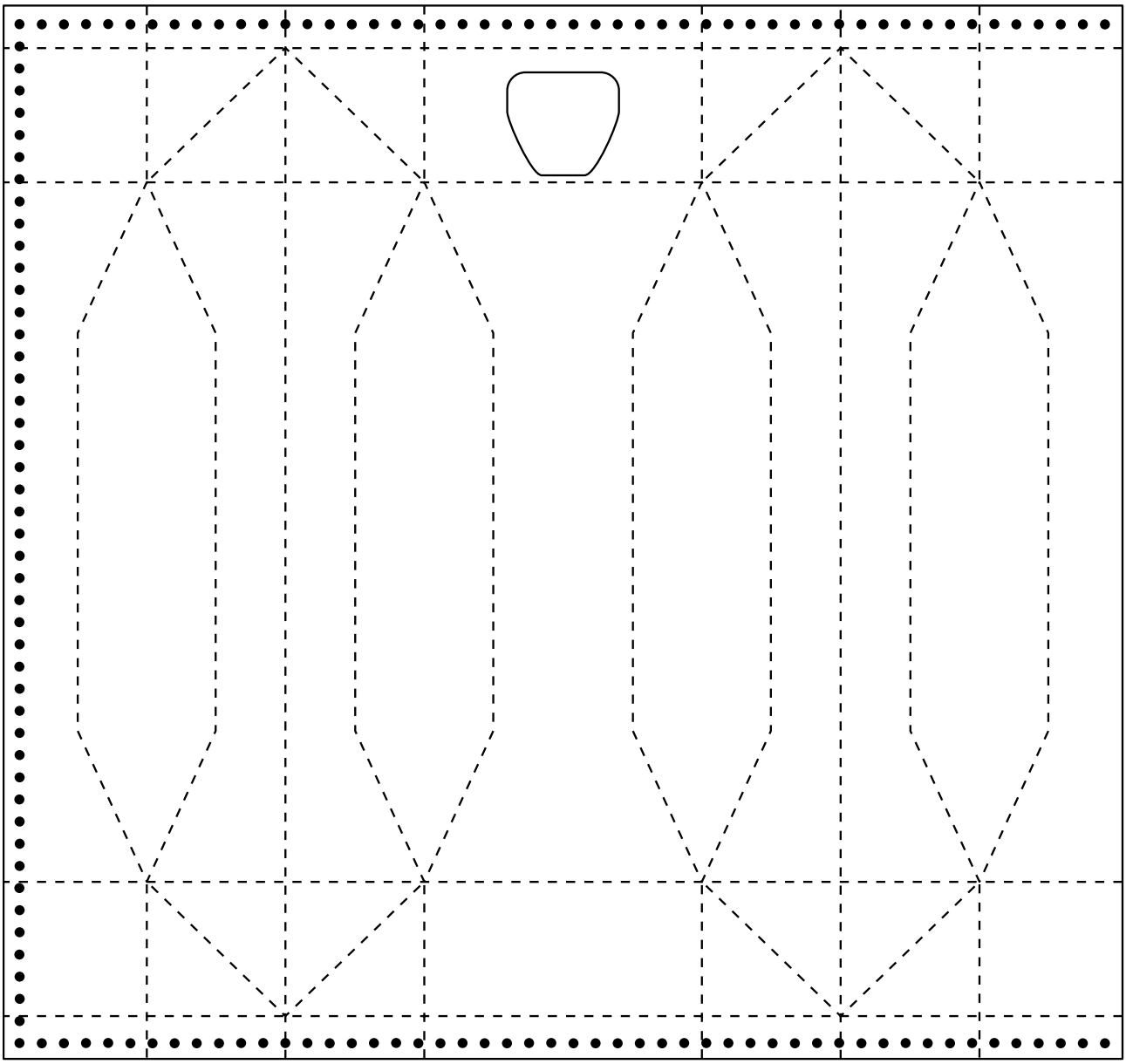


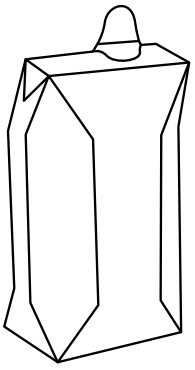


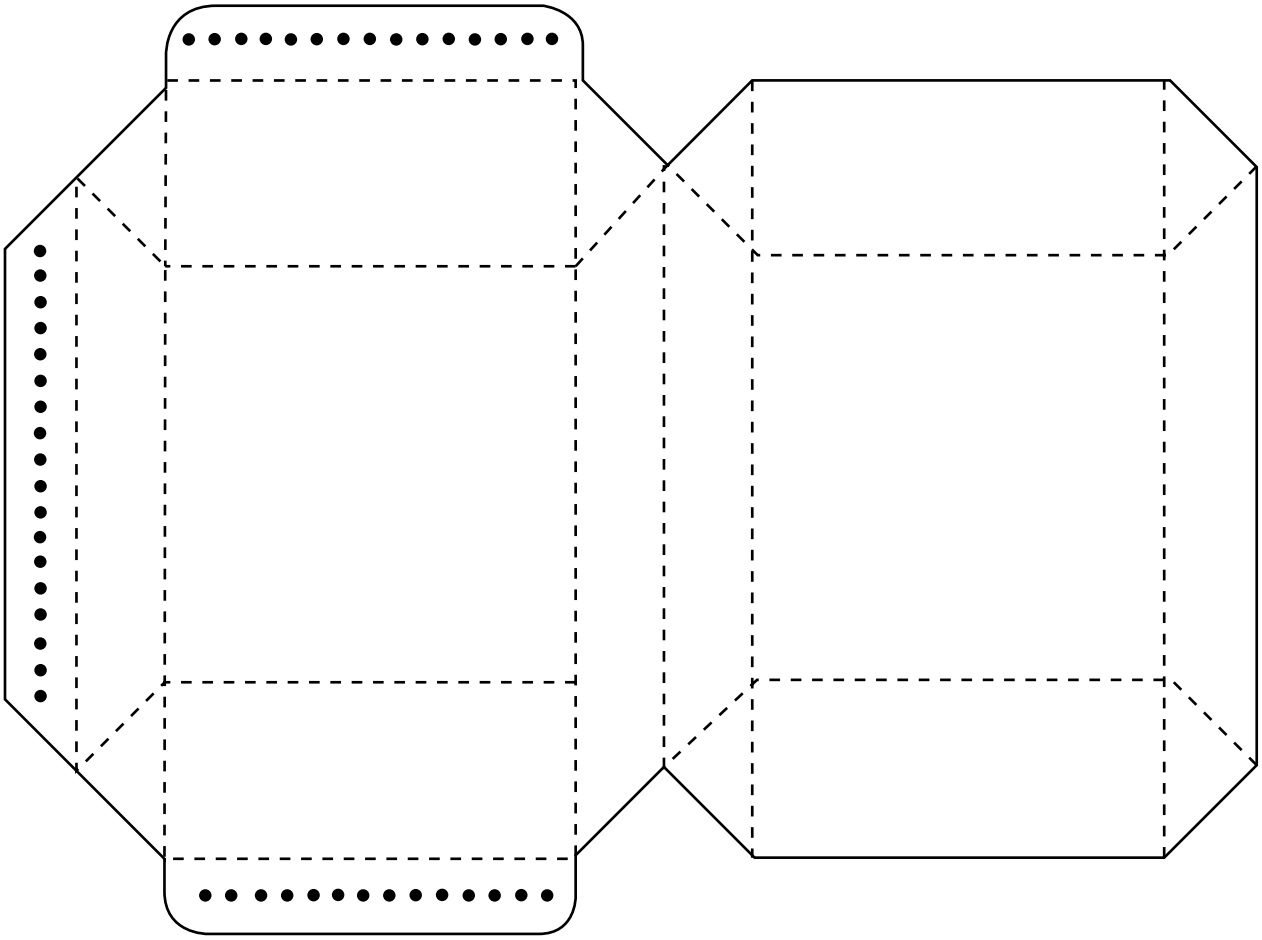


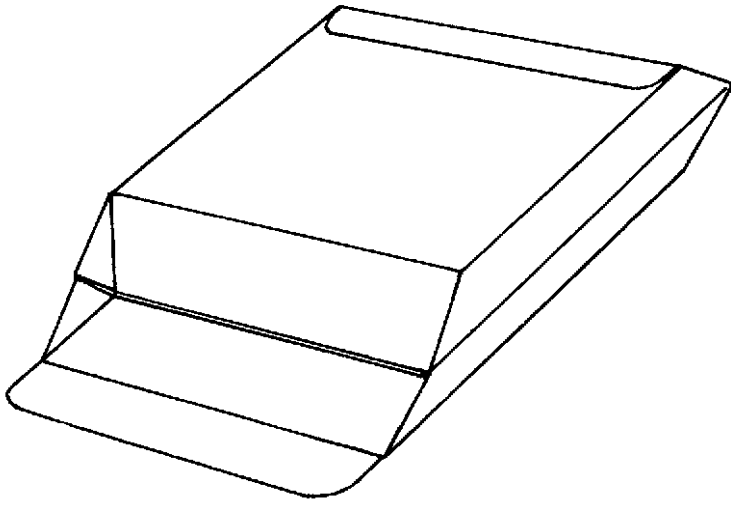
The small squares (A) serve to spot glue the curved riser panel tabs.

ASEPTIC JUICE PACK

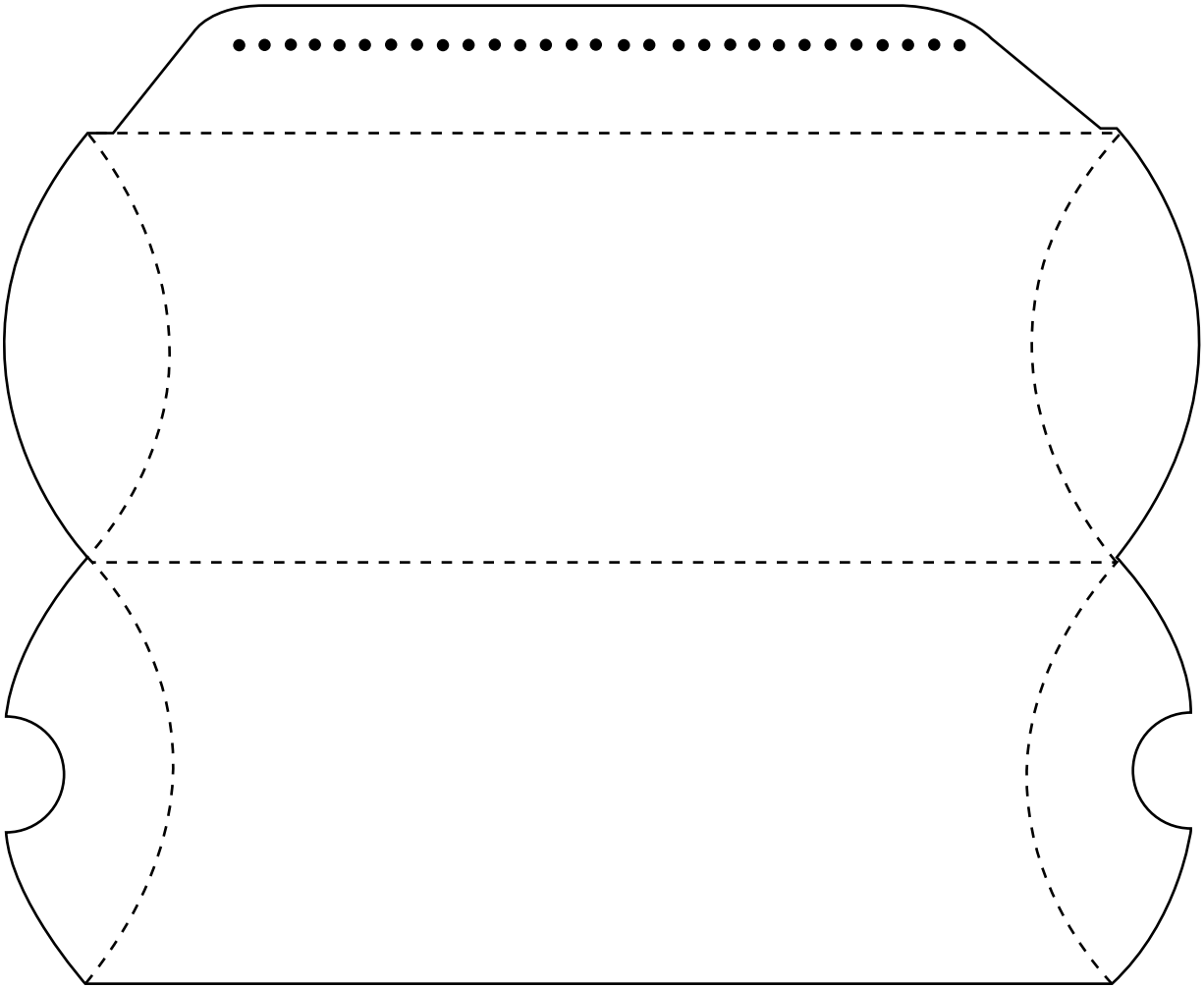


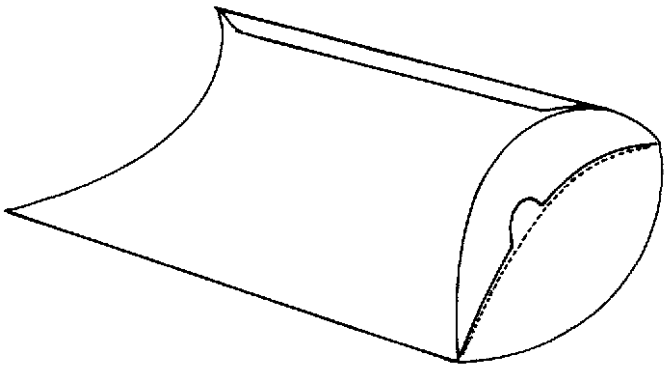


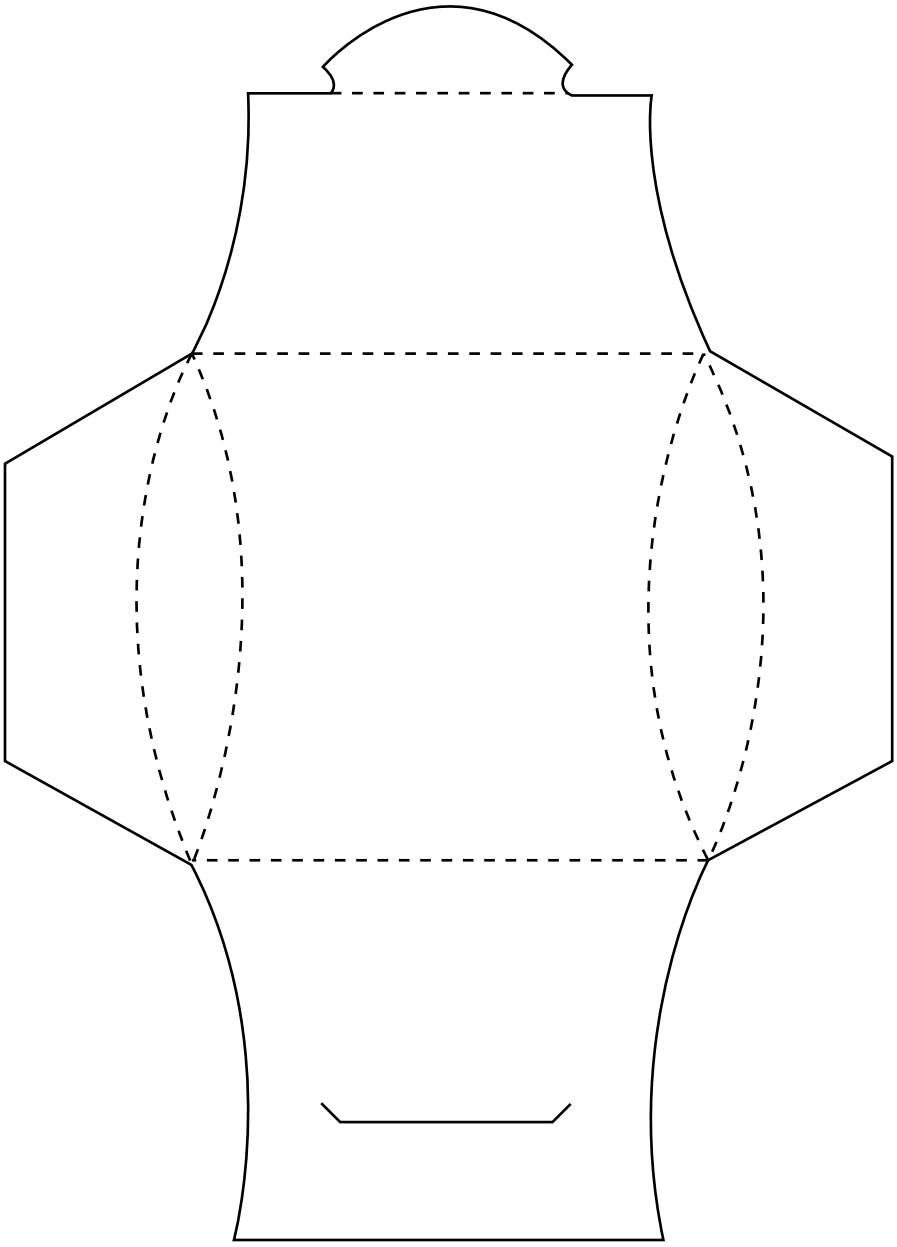


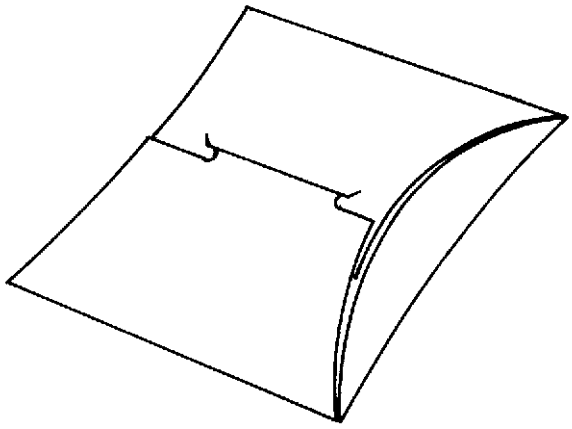


PILLOW PACK

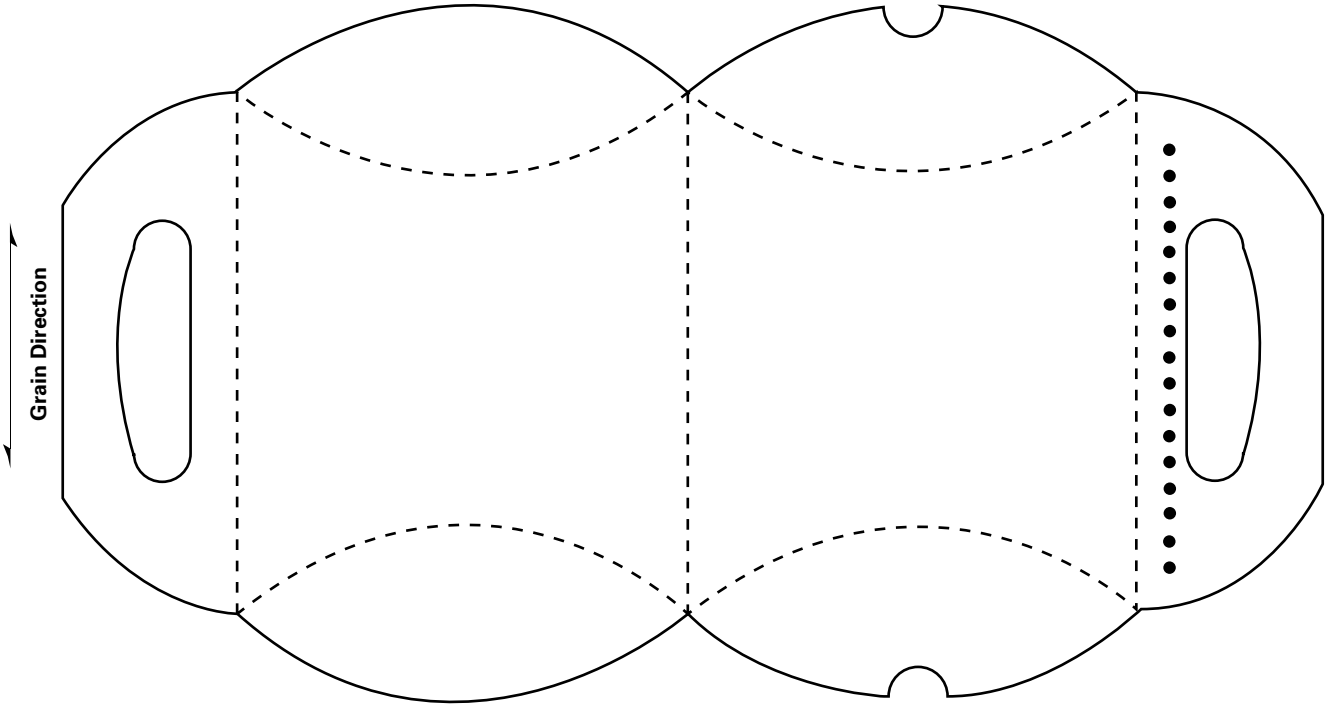


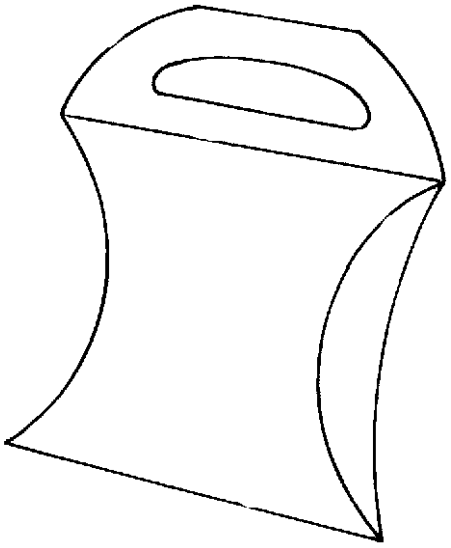


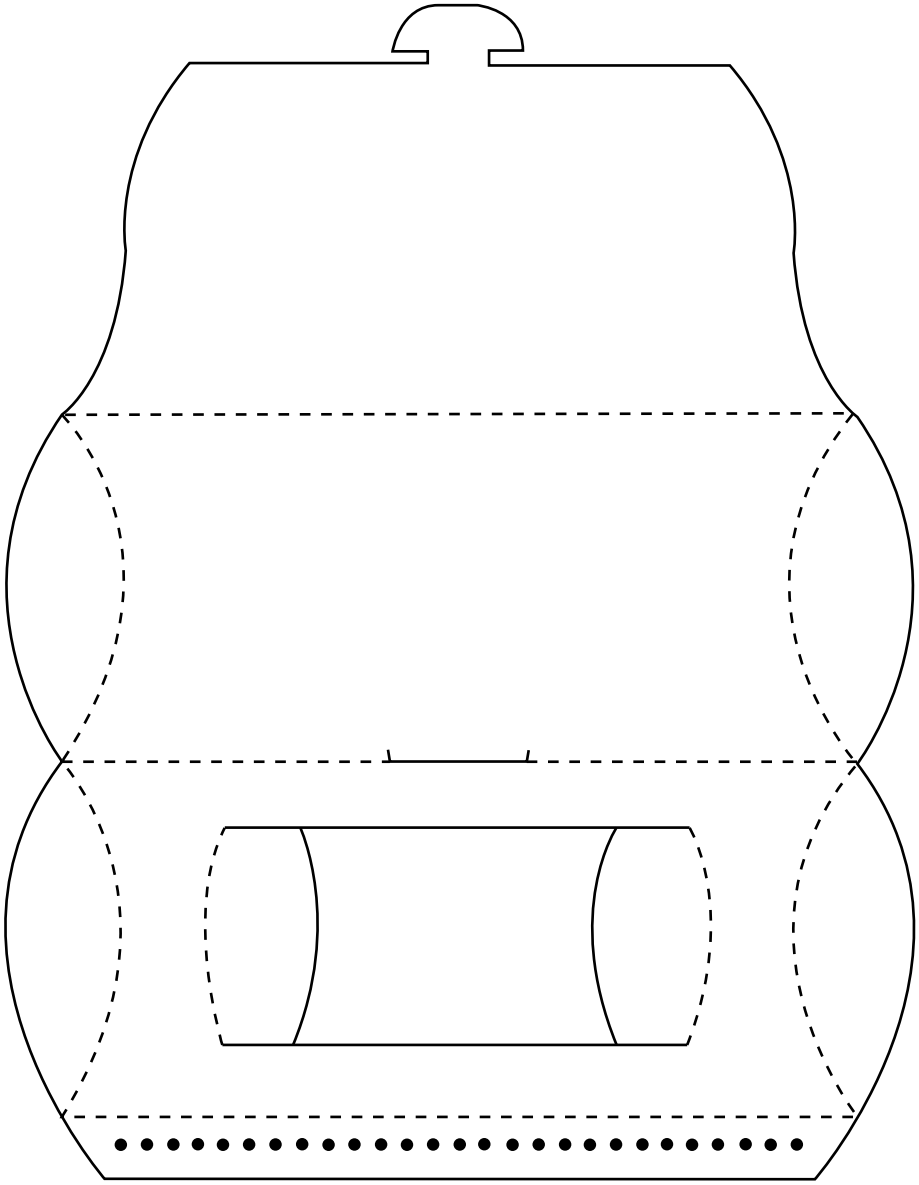


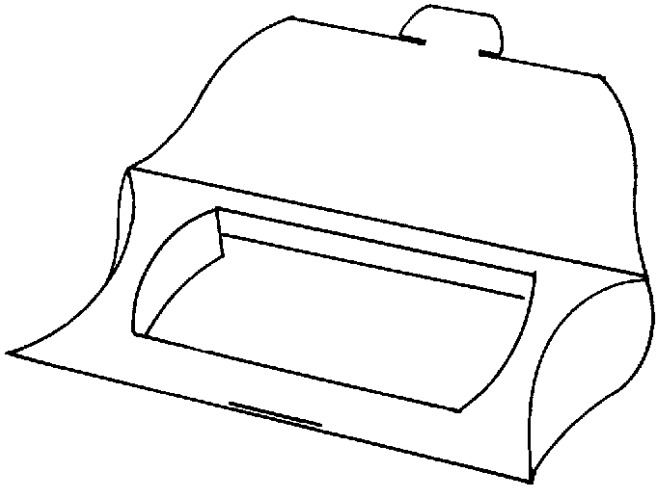


PILLOW PACK WITH HANDLE



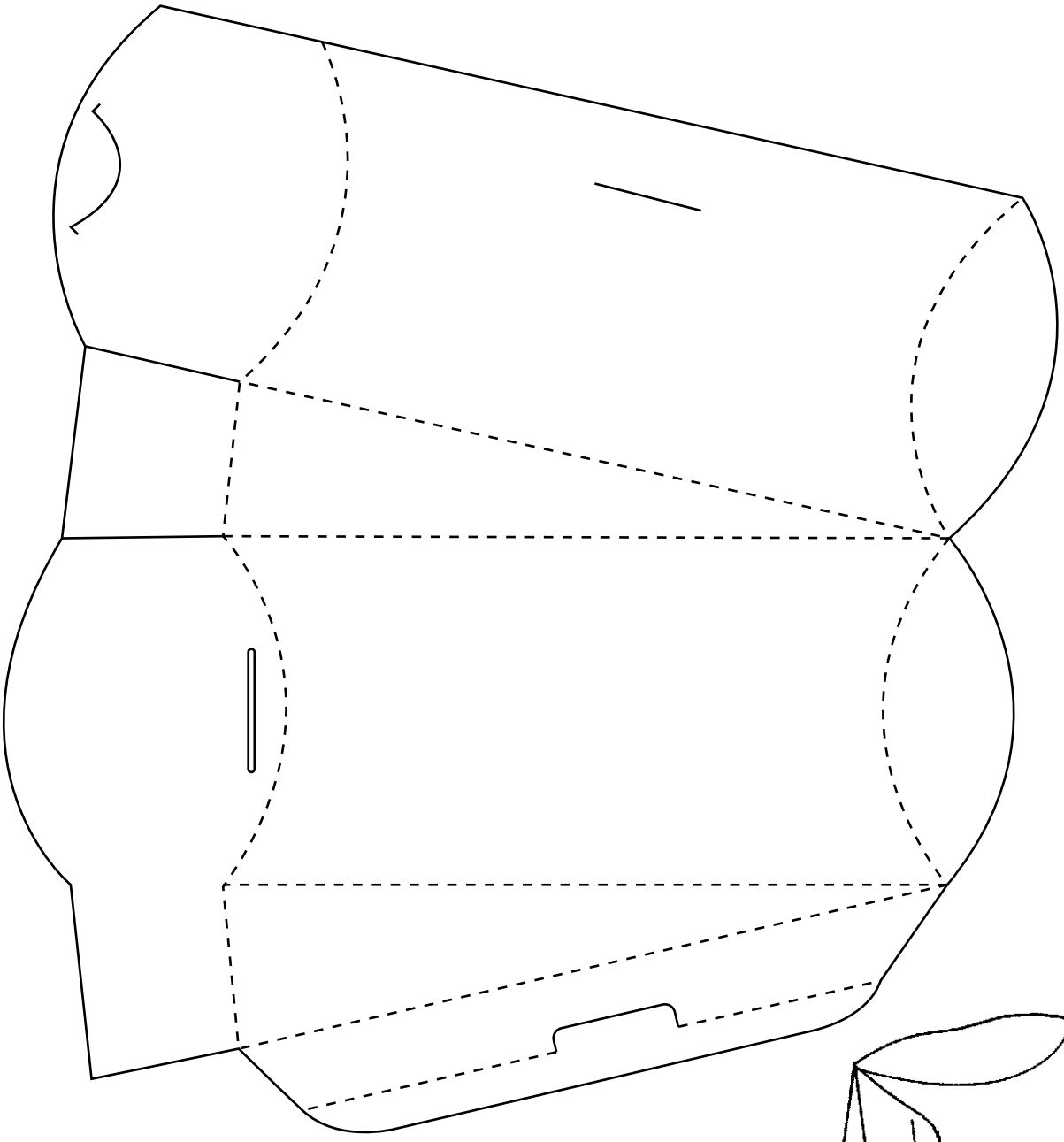


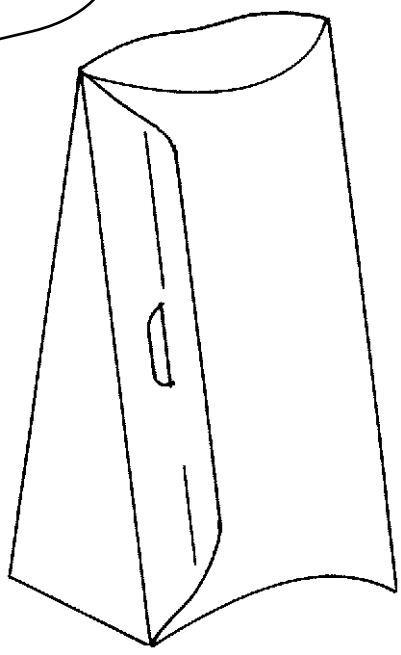


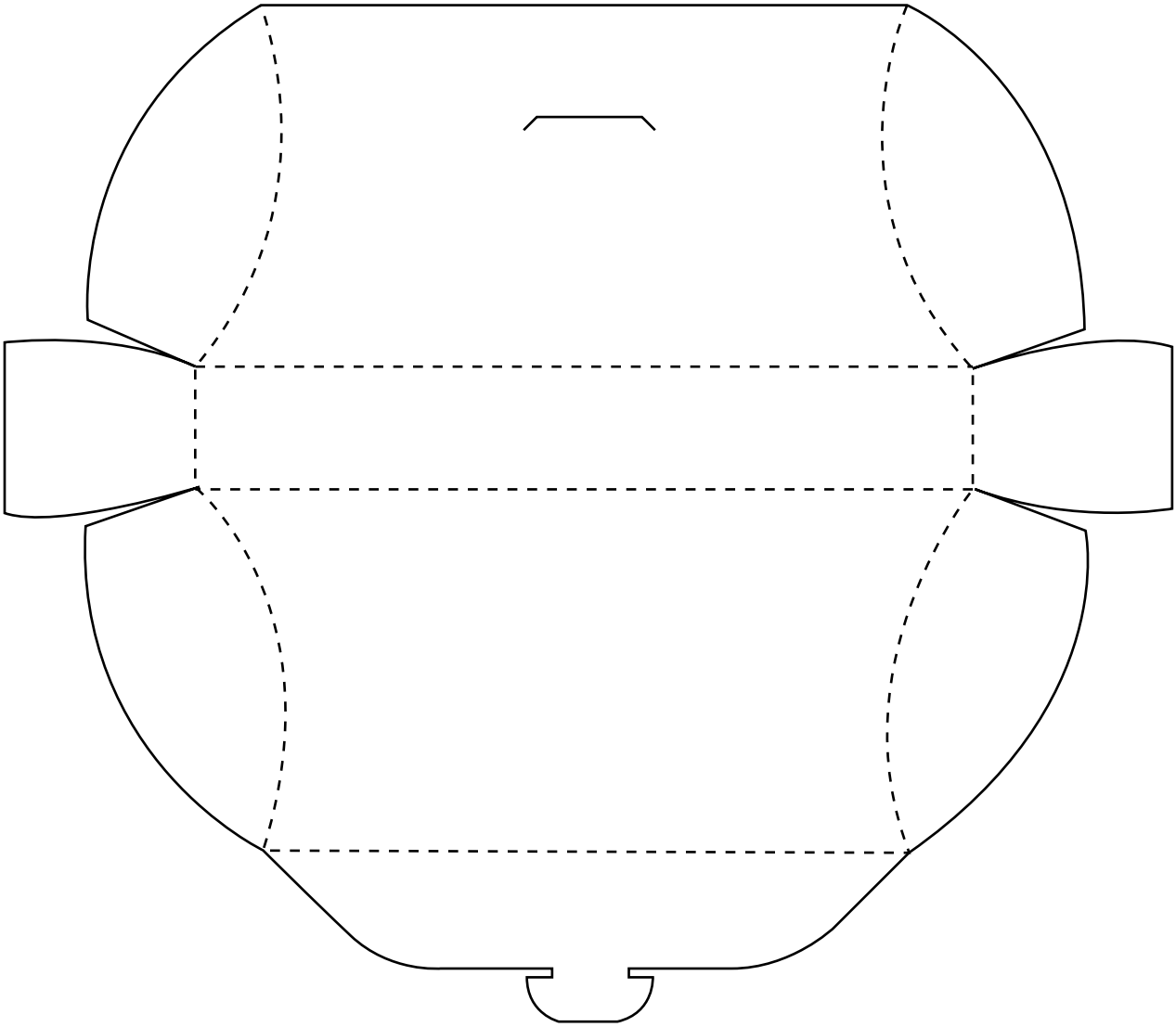


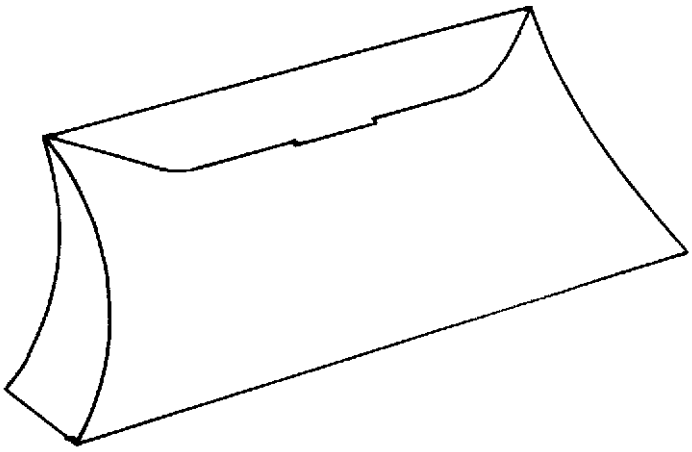
This pillow pack features a cushioned compartment.

PILLOW PACK VARIATION

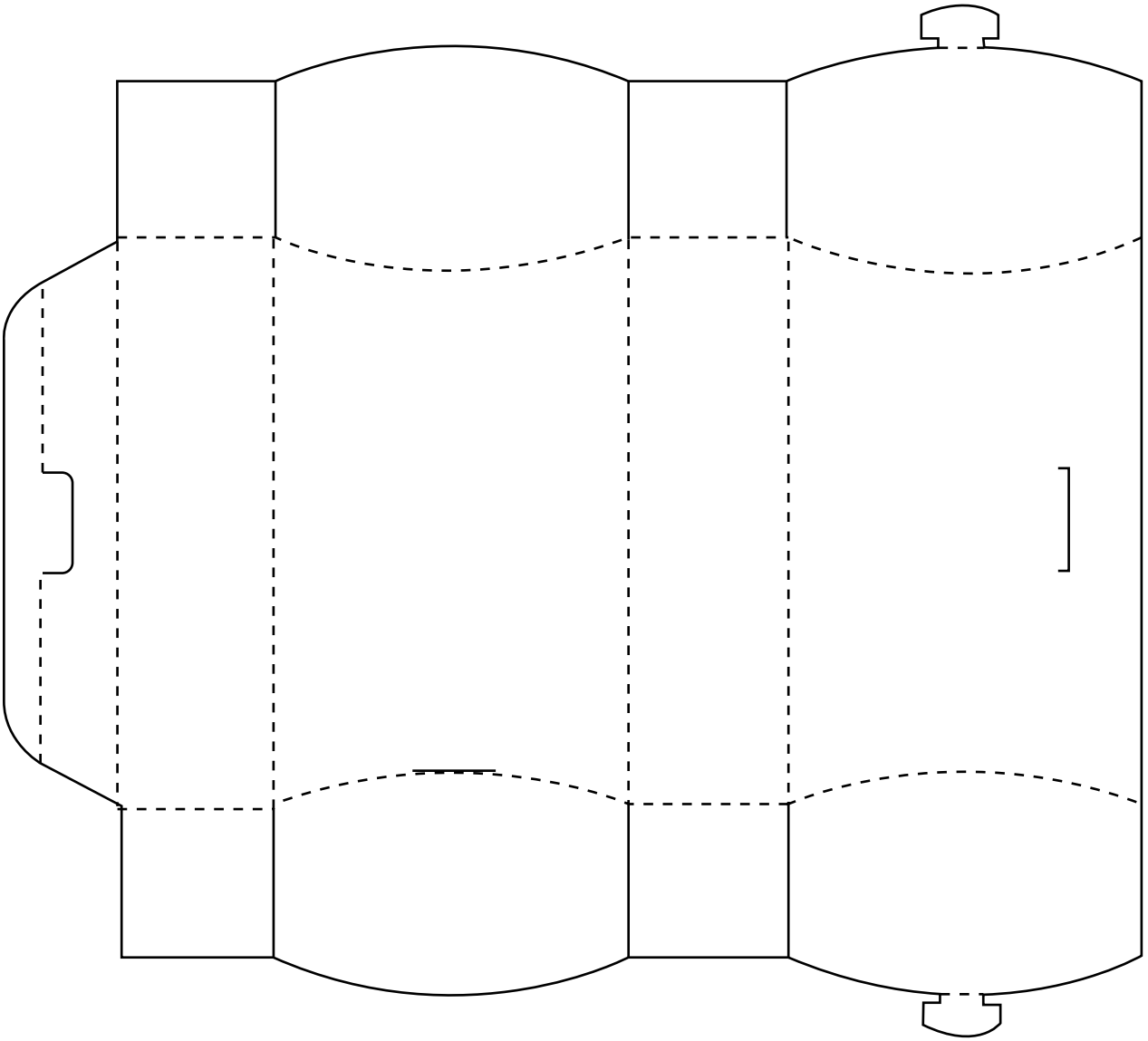


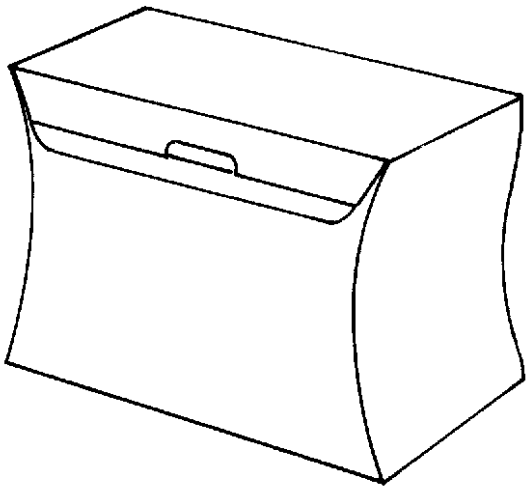


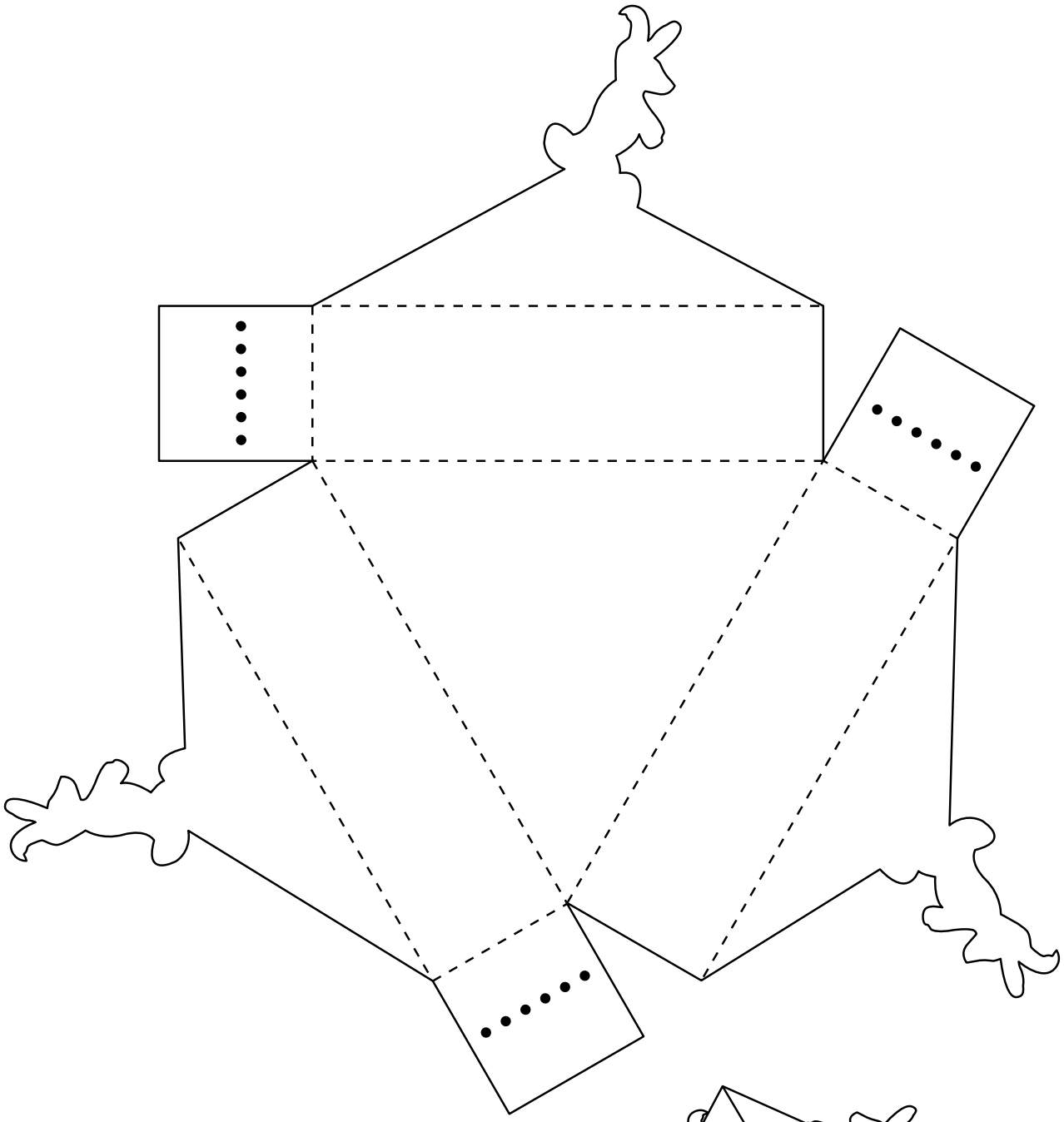




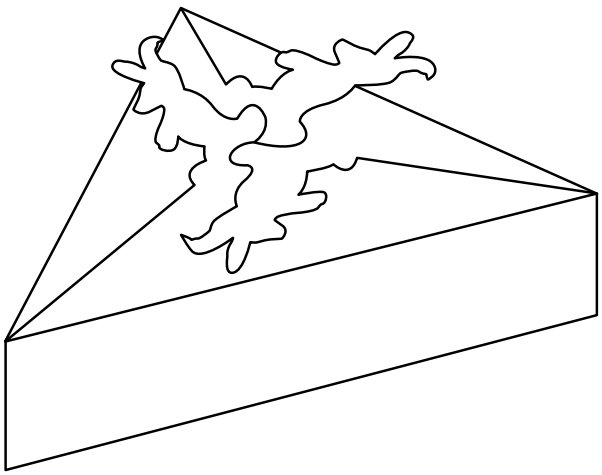
PILLOW PACK VARIATION



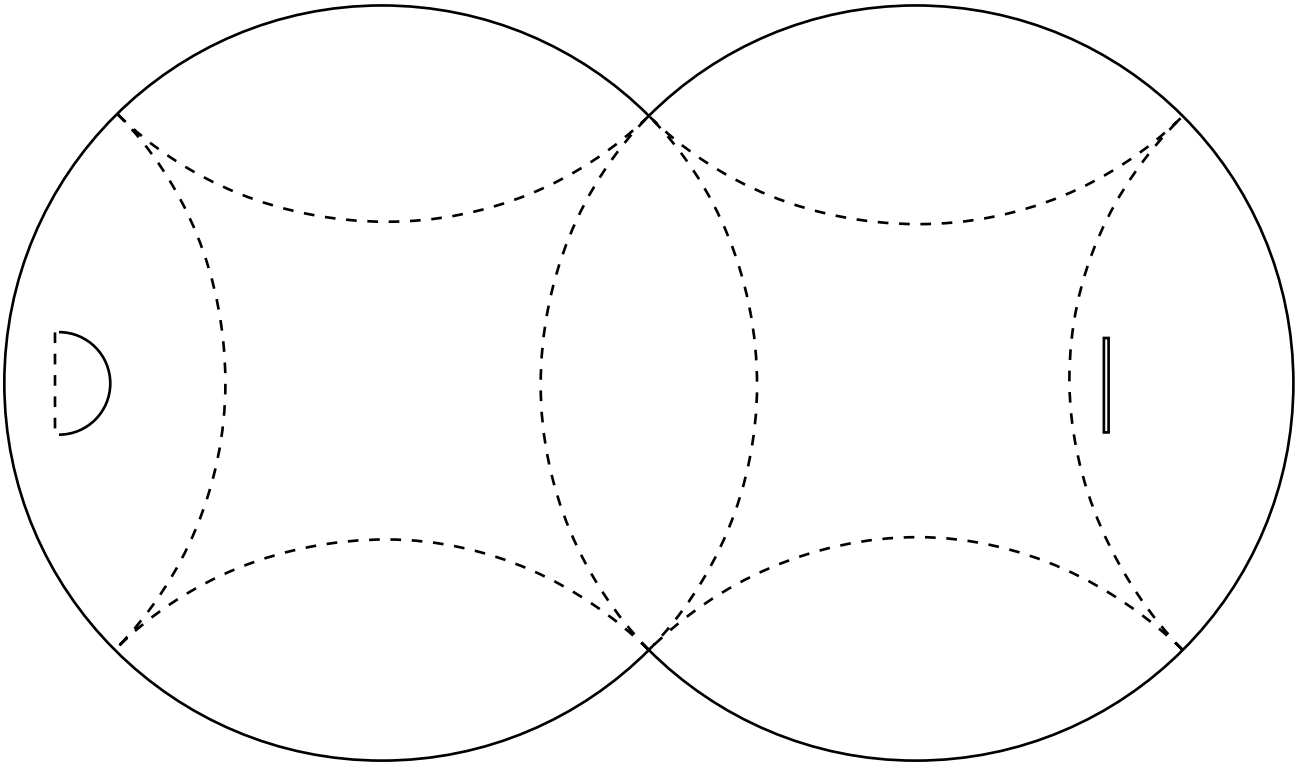


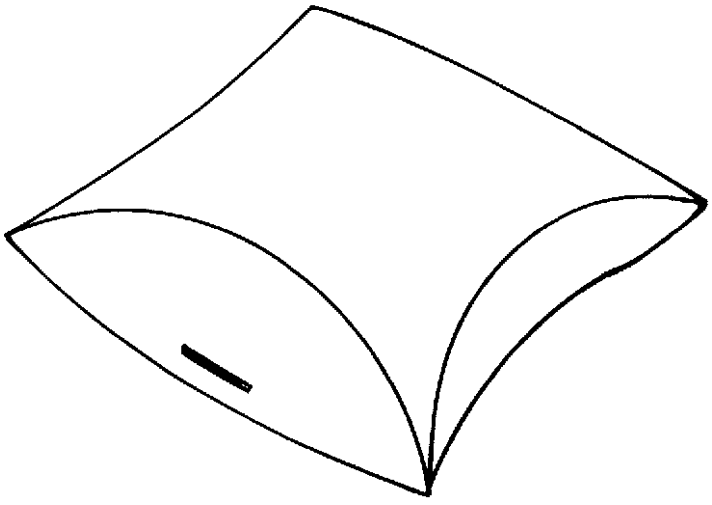


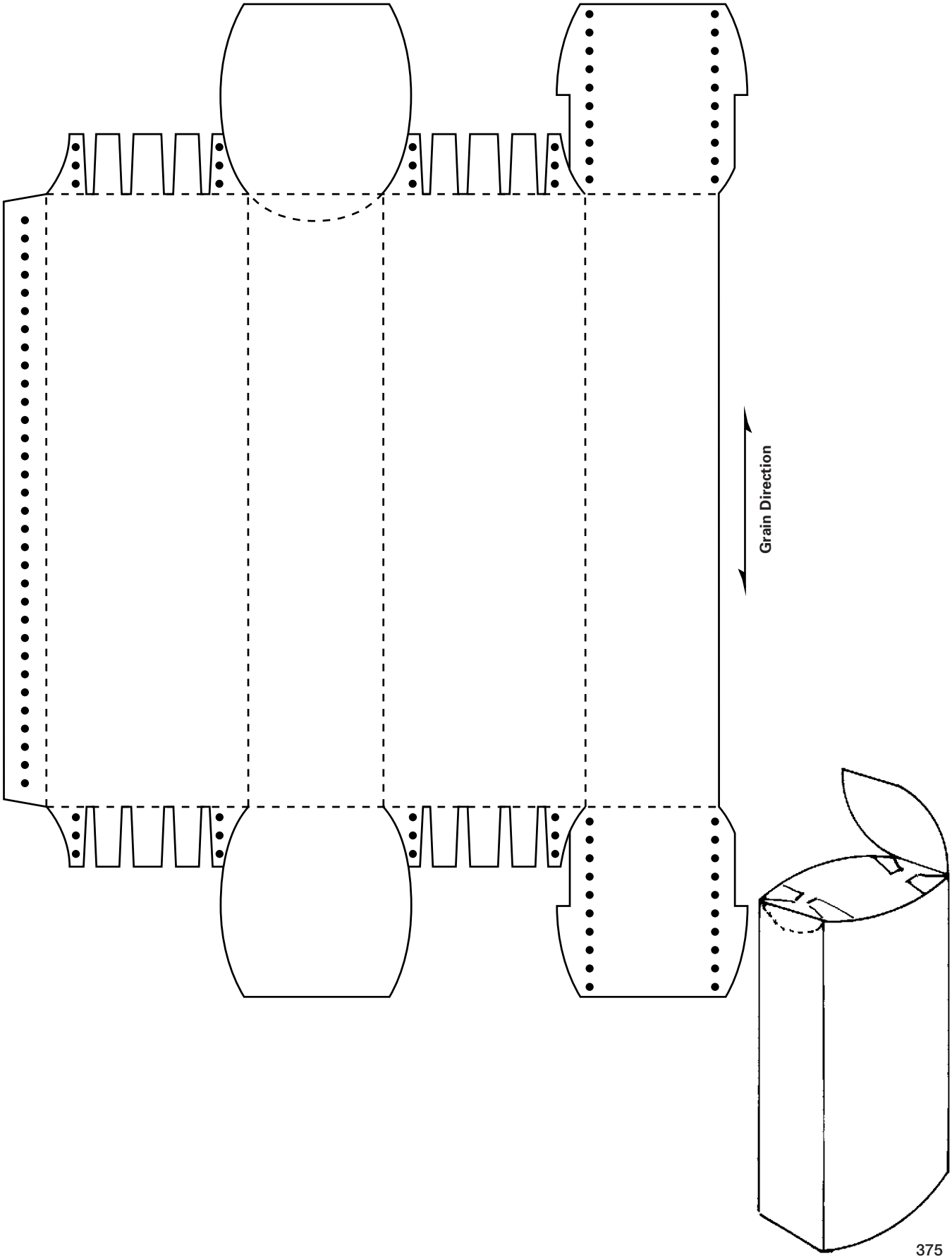
The interlocking images serving as closures denote the season.



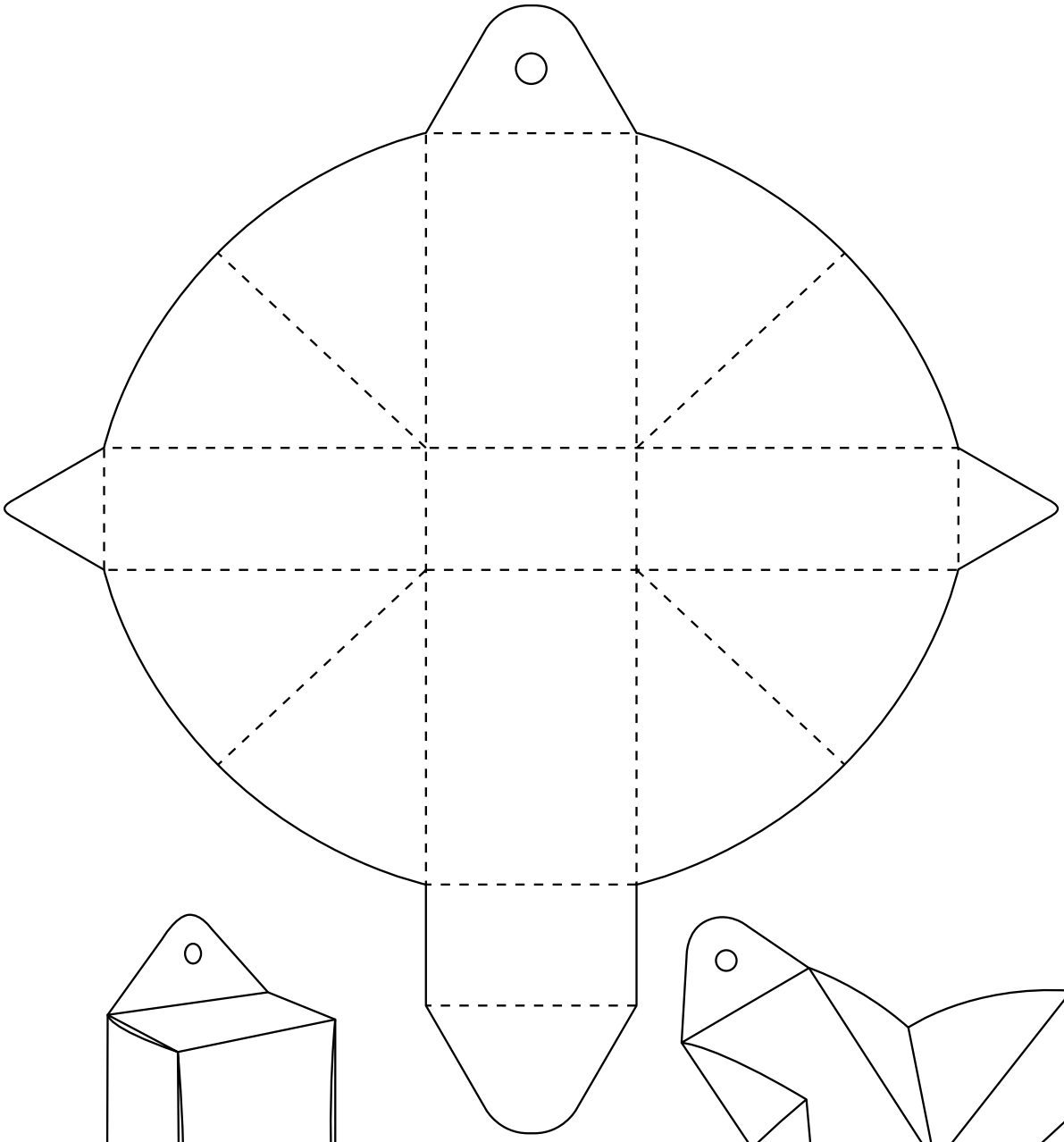
PILLOW PACK

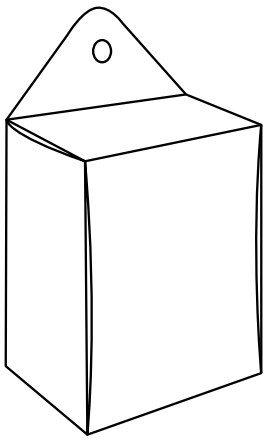


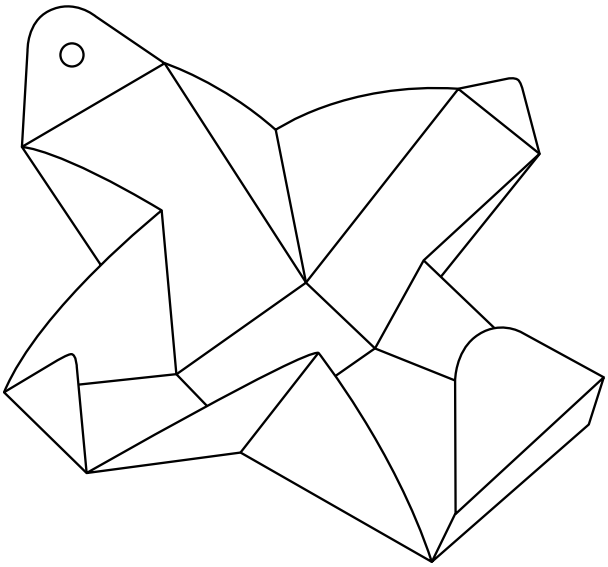



Grain Direction

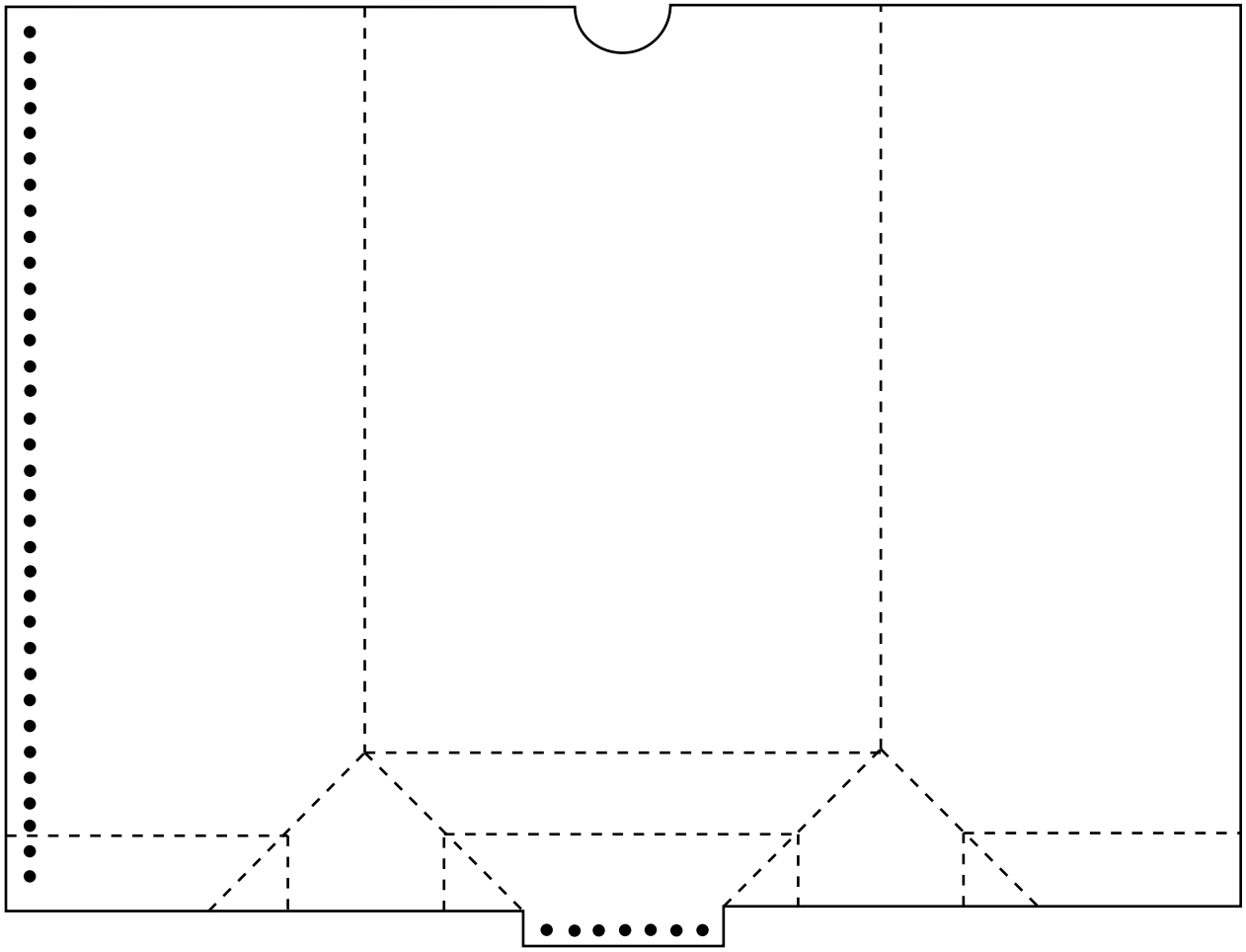
BOX FROM A CIRCLE WITH HANG TAB

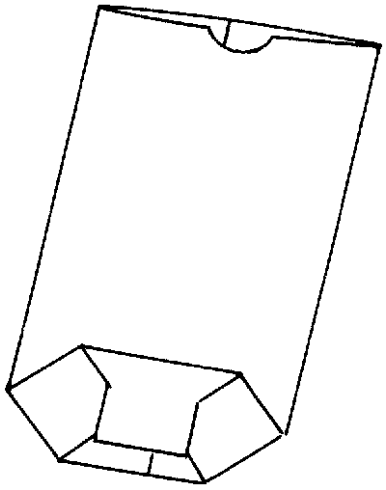




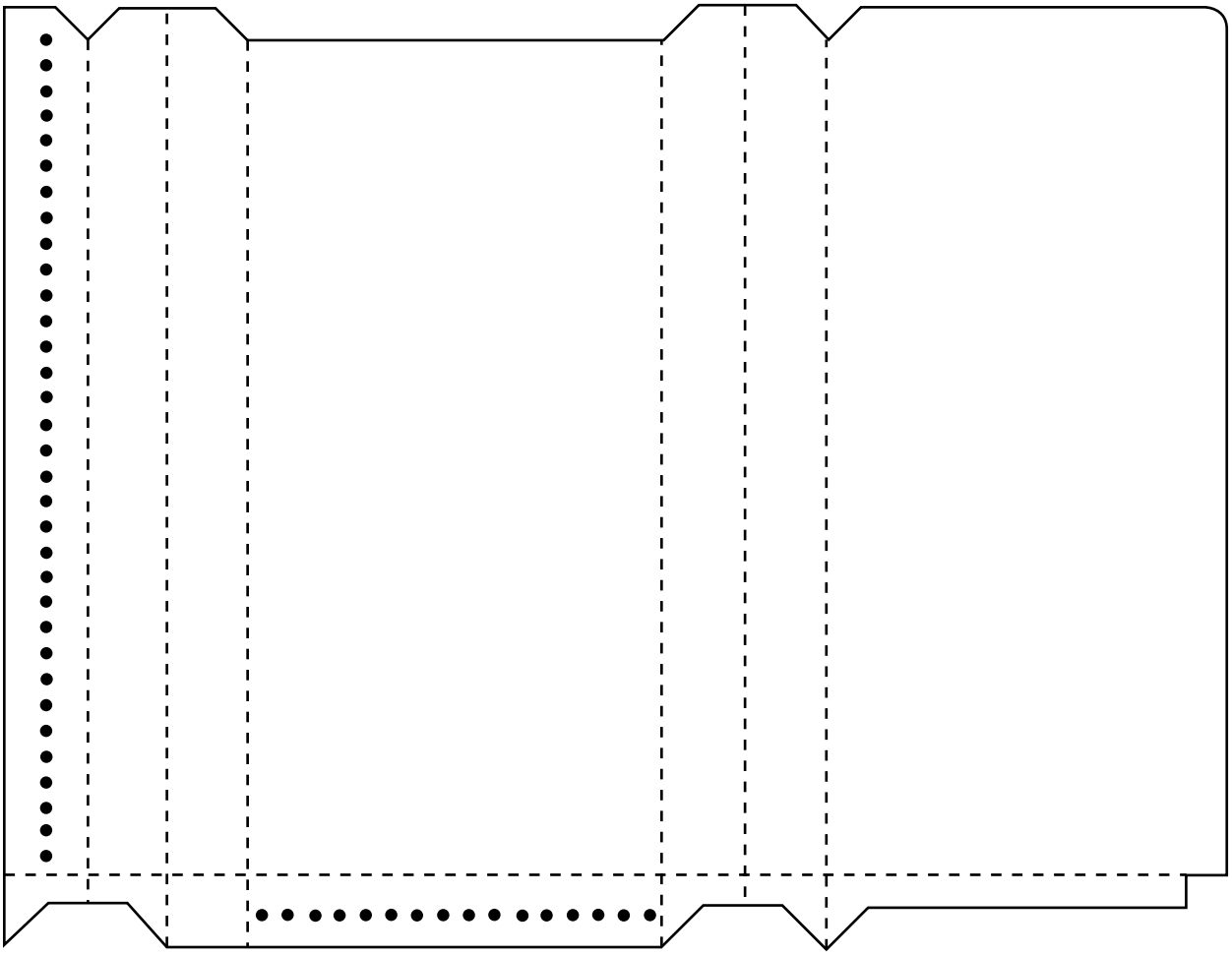


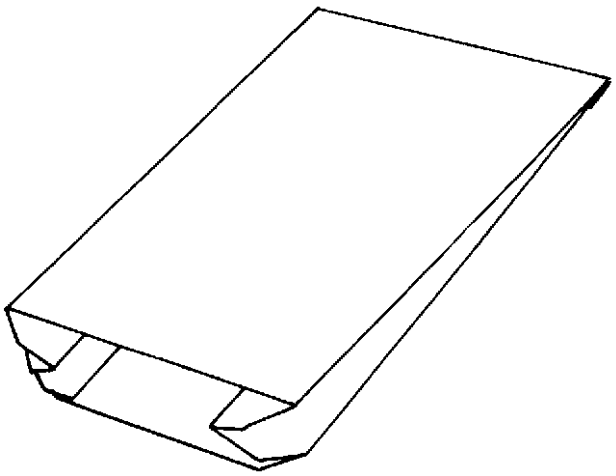
No glue required for assembly

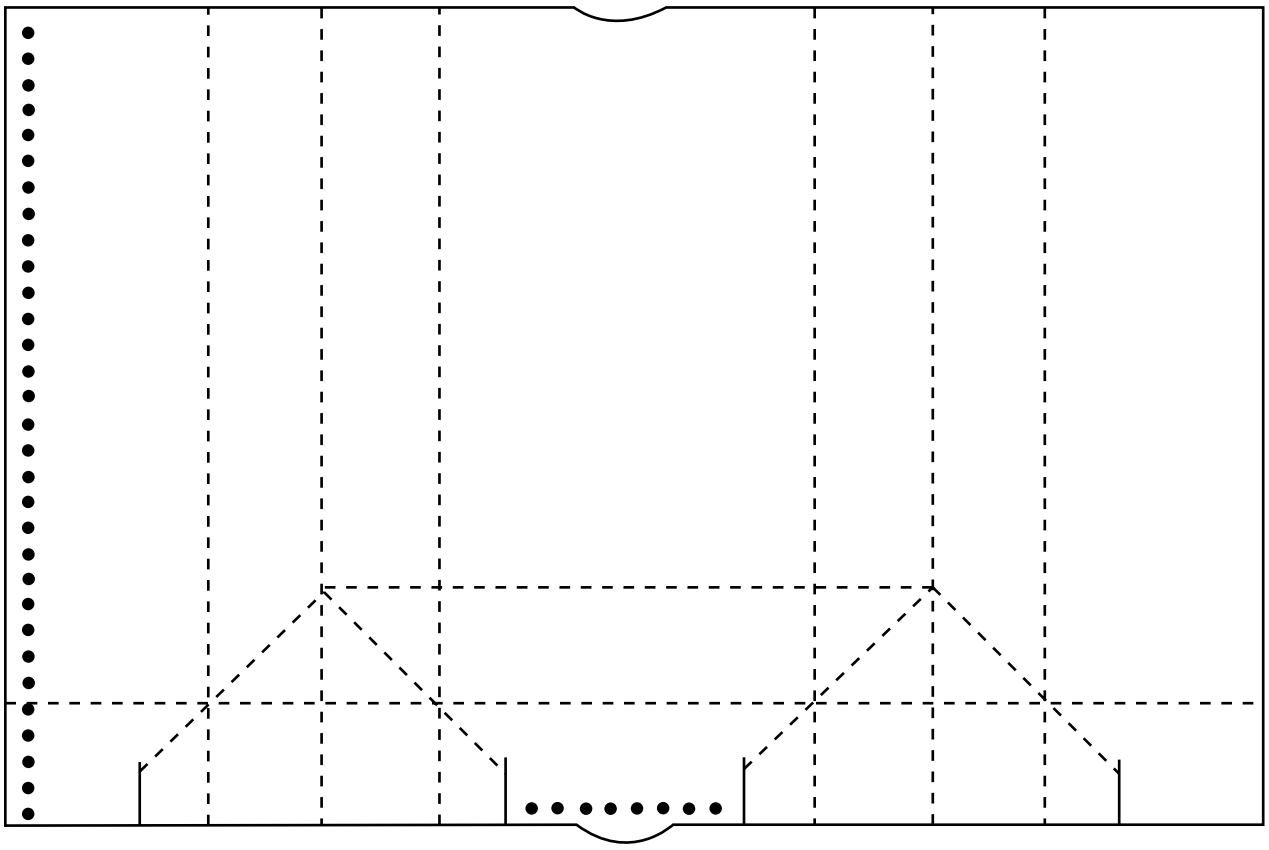


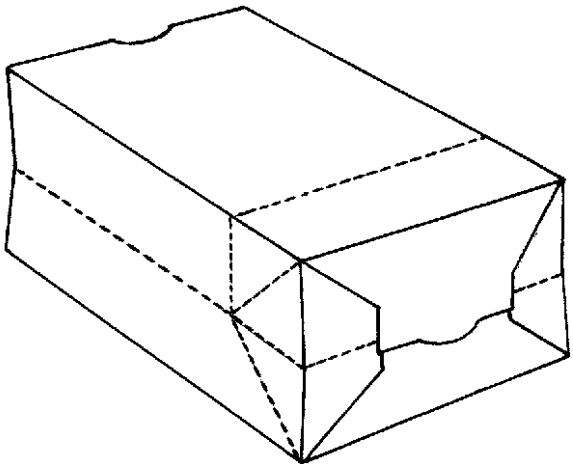


BAG WITH SIDE GUSSETS



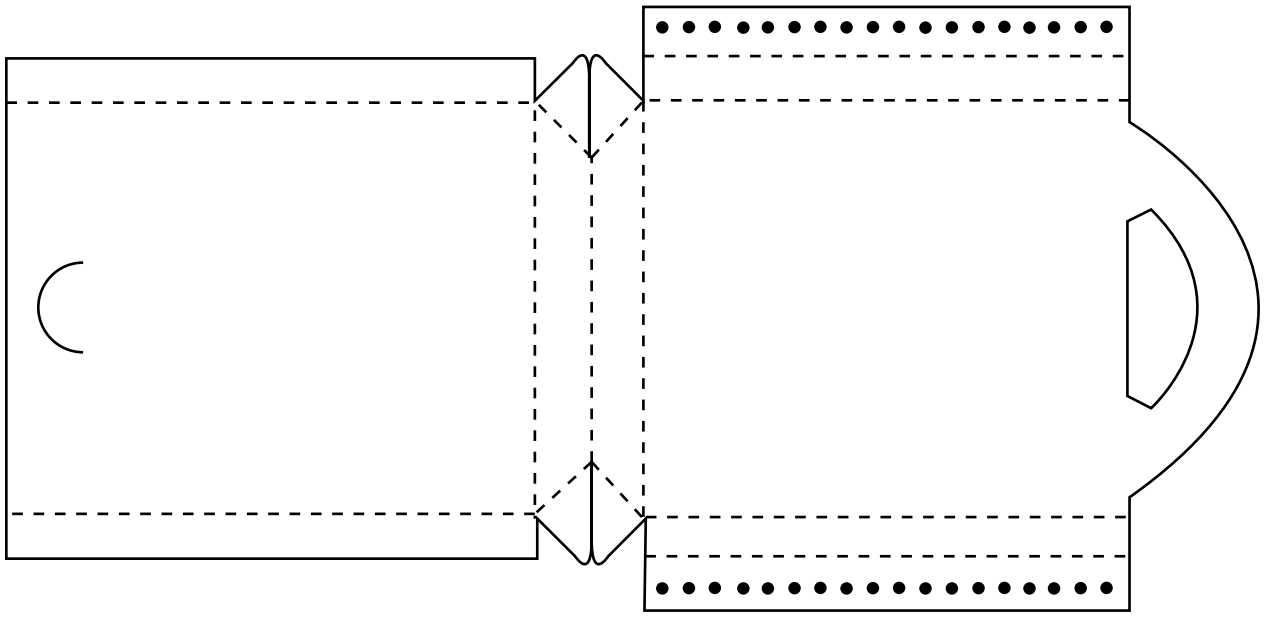


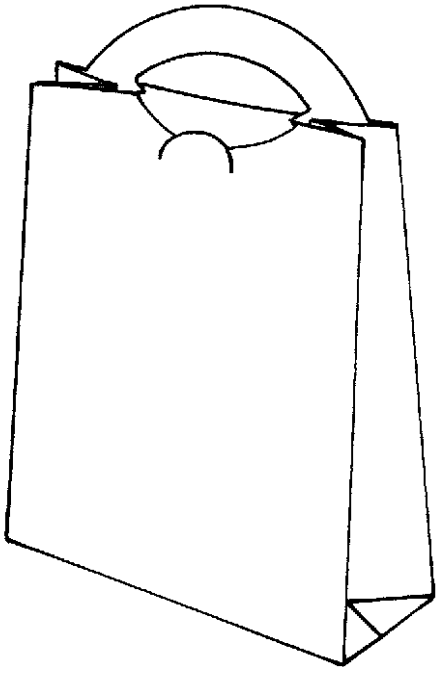


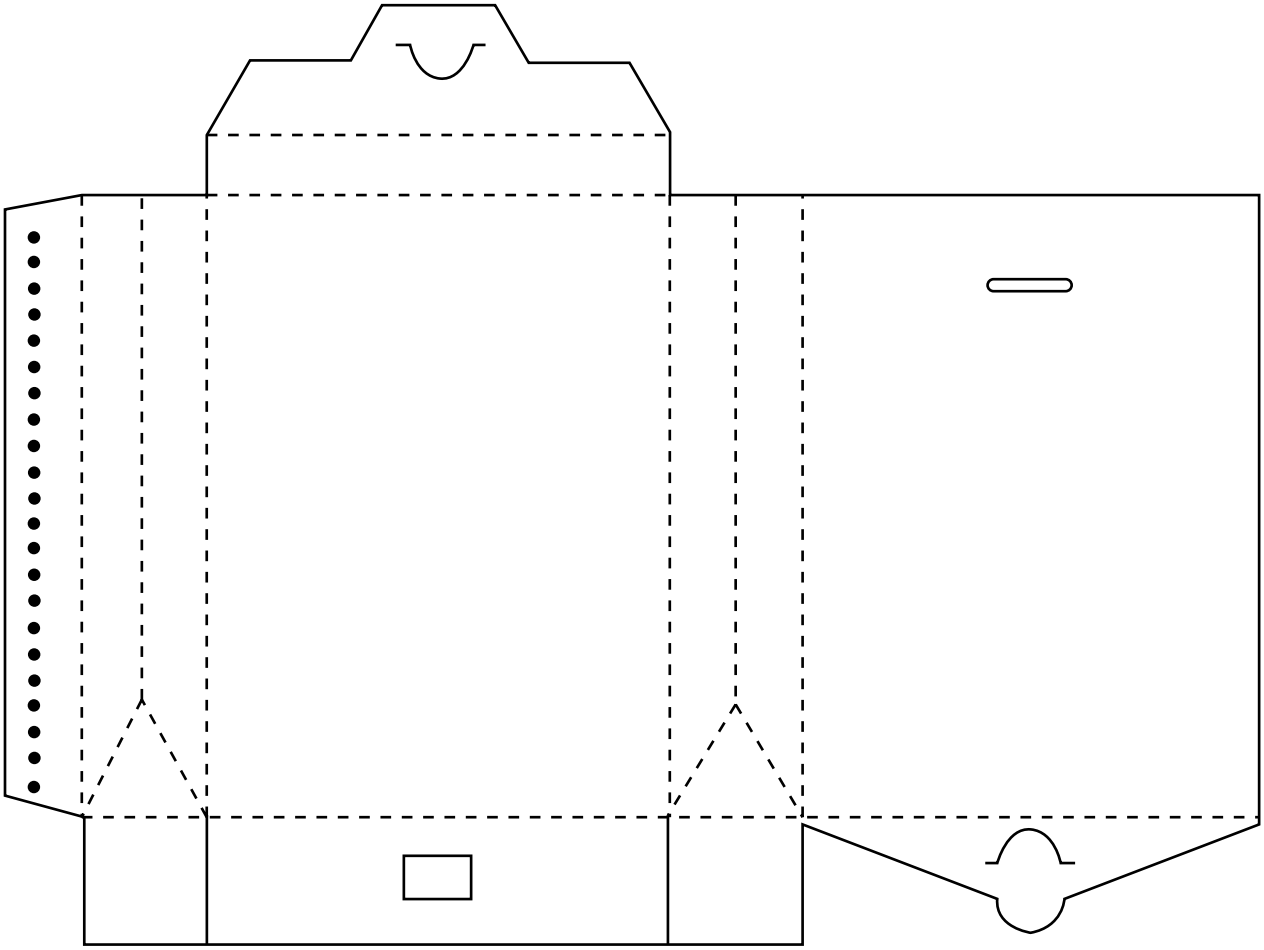


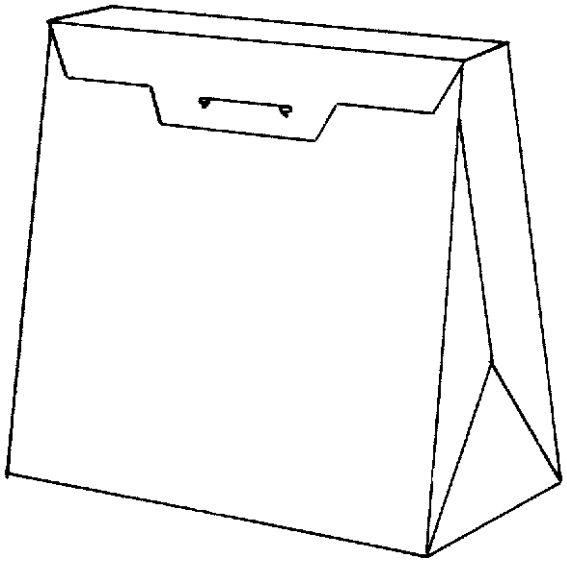
Typical prototype for grocery bag, shopping bag, etc.

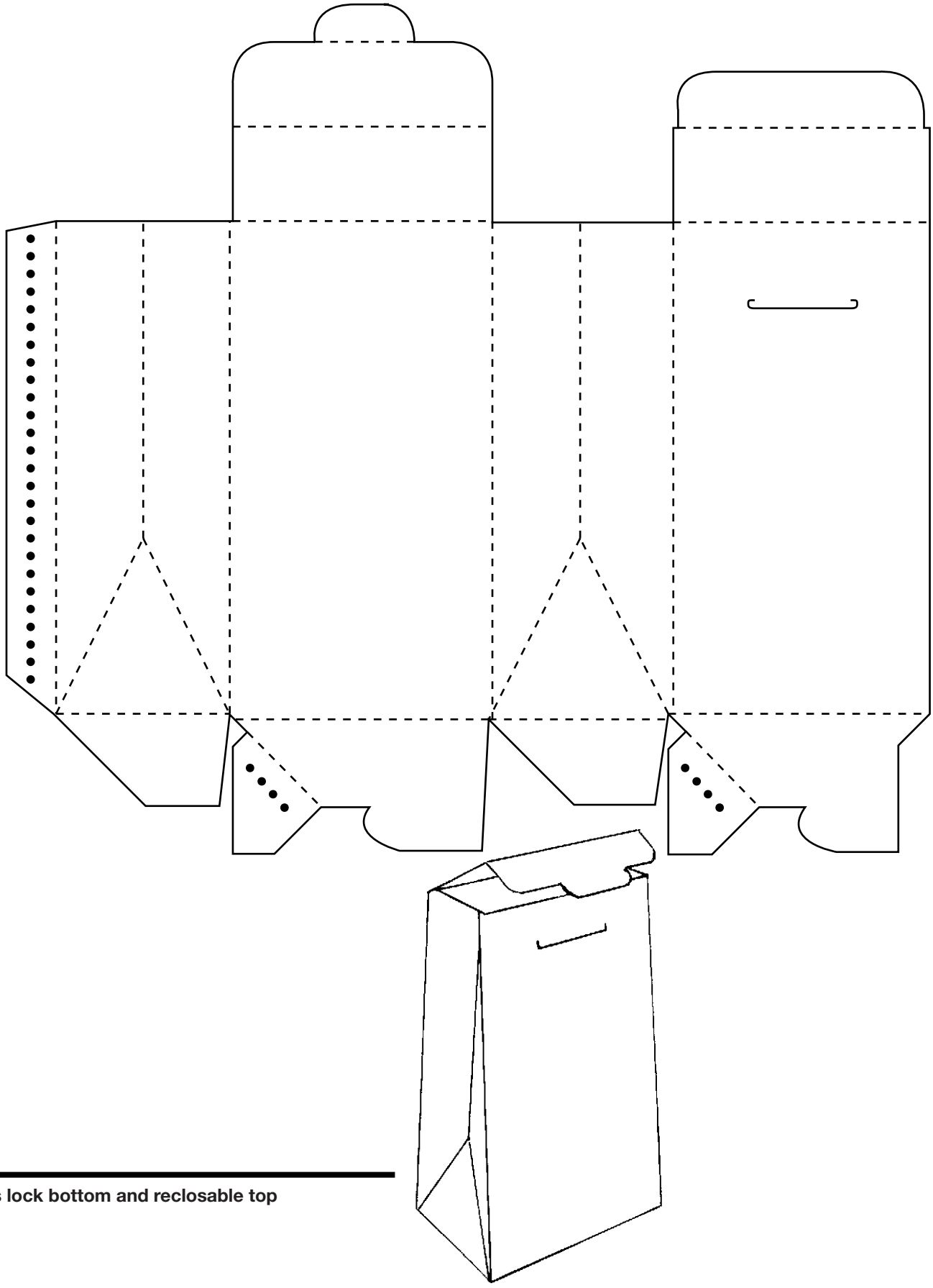
BAG WITH GLUED GUSSETED SIDES, CARRYING HANDLE, AND CLOSURE TAB



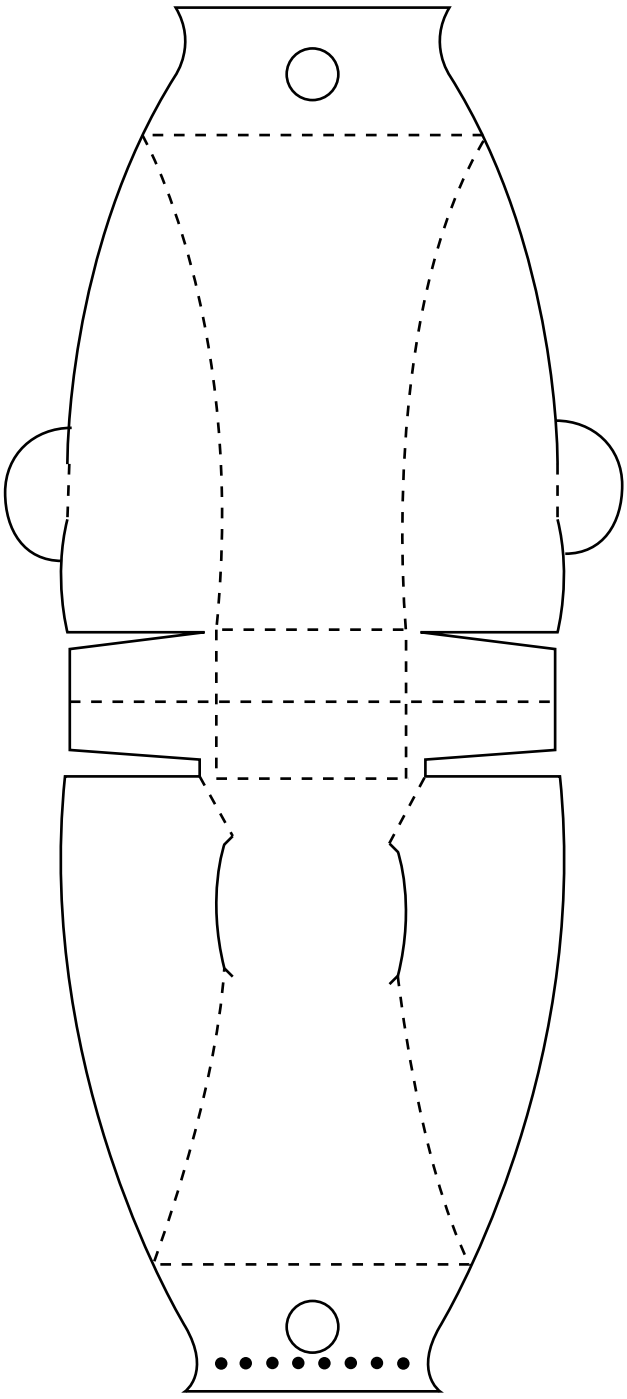


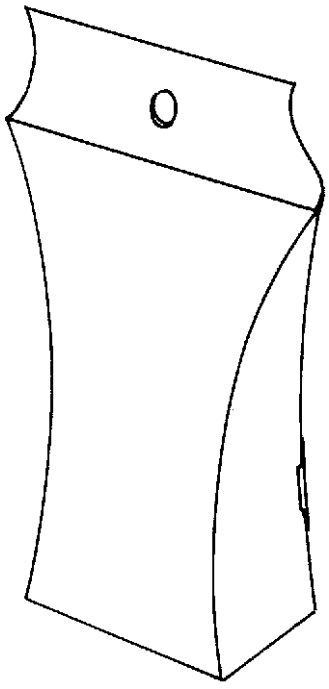




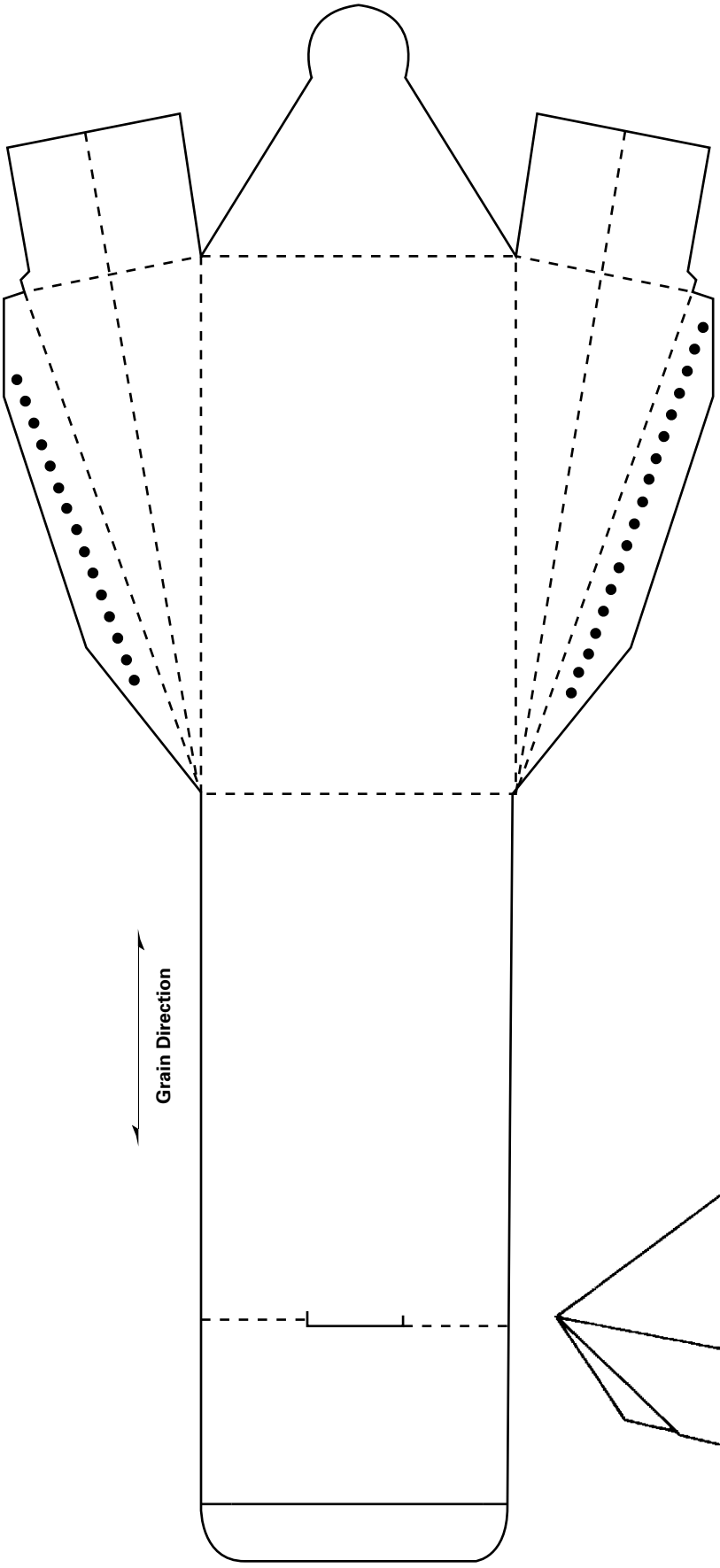


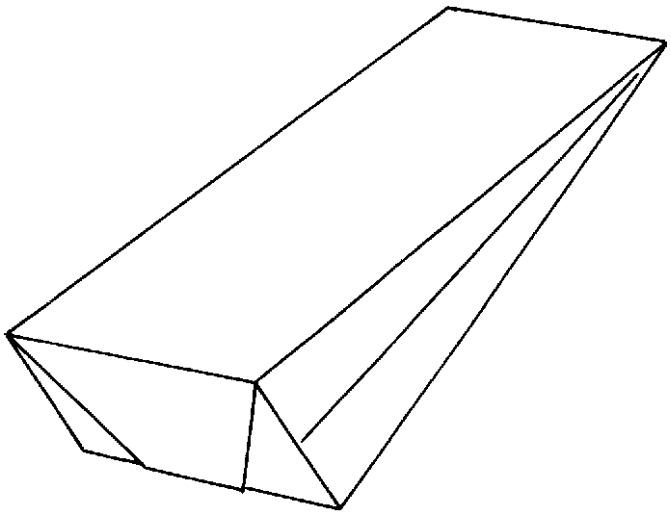
Himes lock bottom and reclosable top



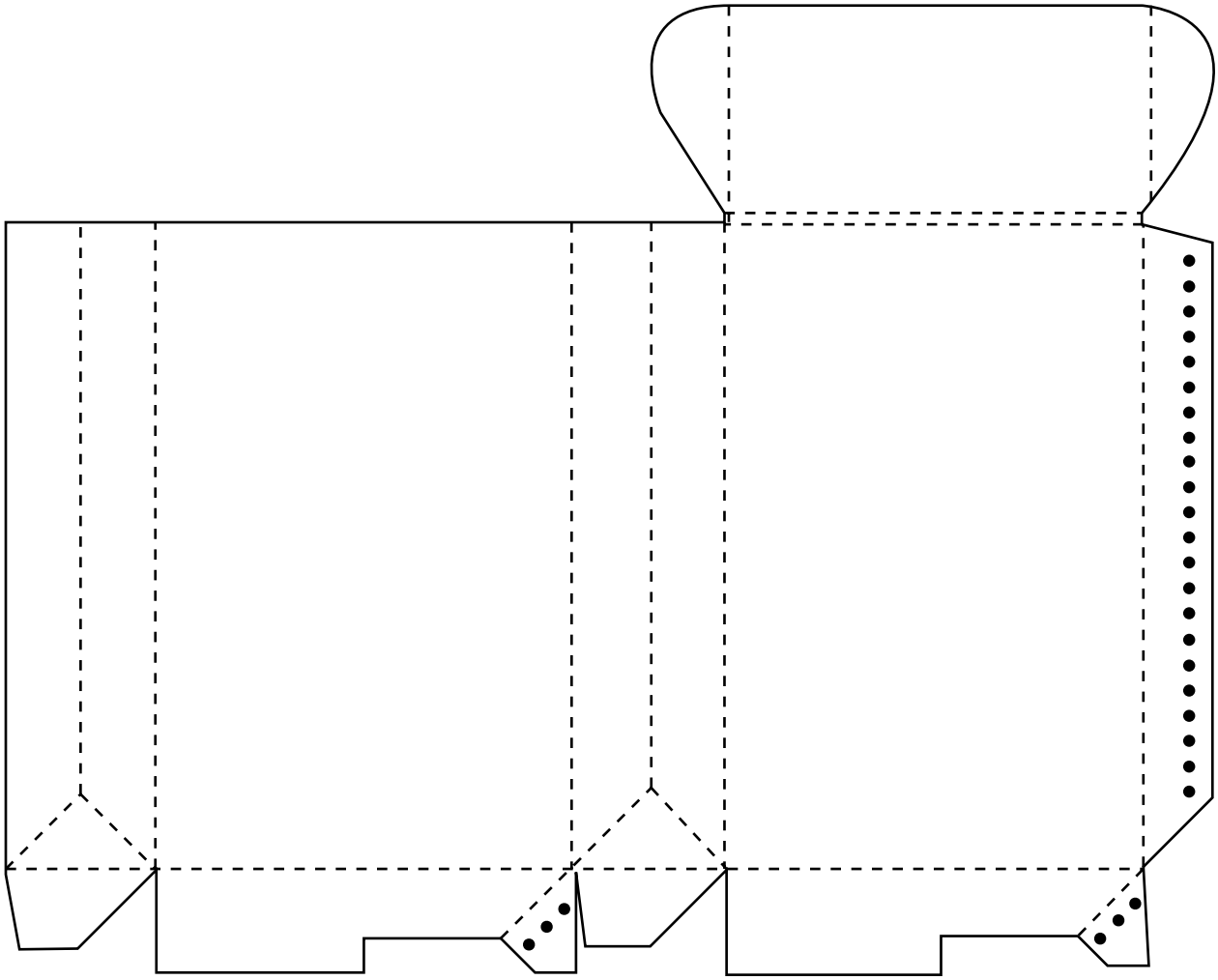


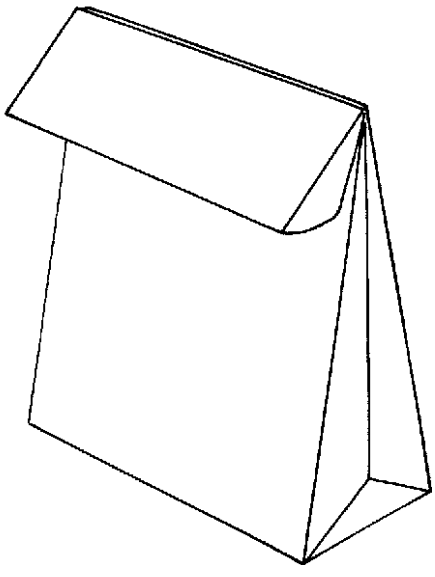
GUSSETED PAPER BAG



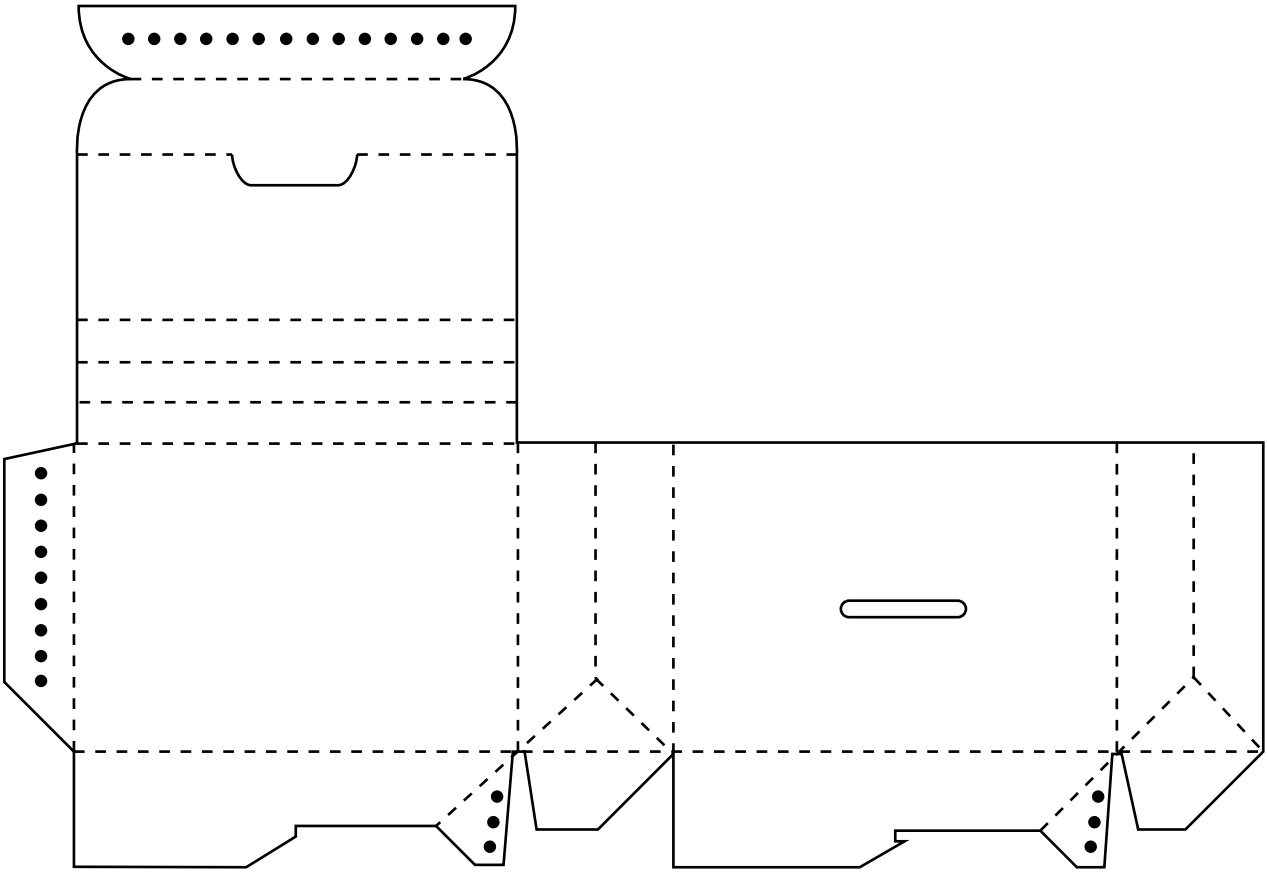


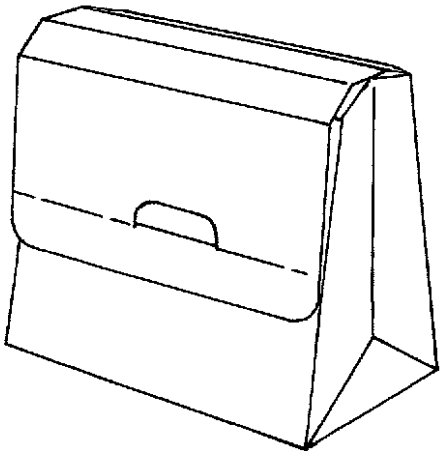
GUSSETED BAG WITH HIMES LOCK AUTOMATIC BOTTOM, GUSSETED SIDES, AND FLAPS ON COVER THAT LOCK INTO GUSSET

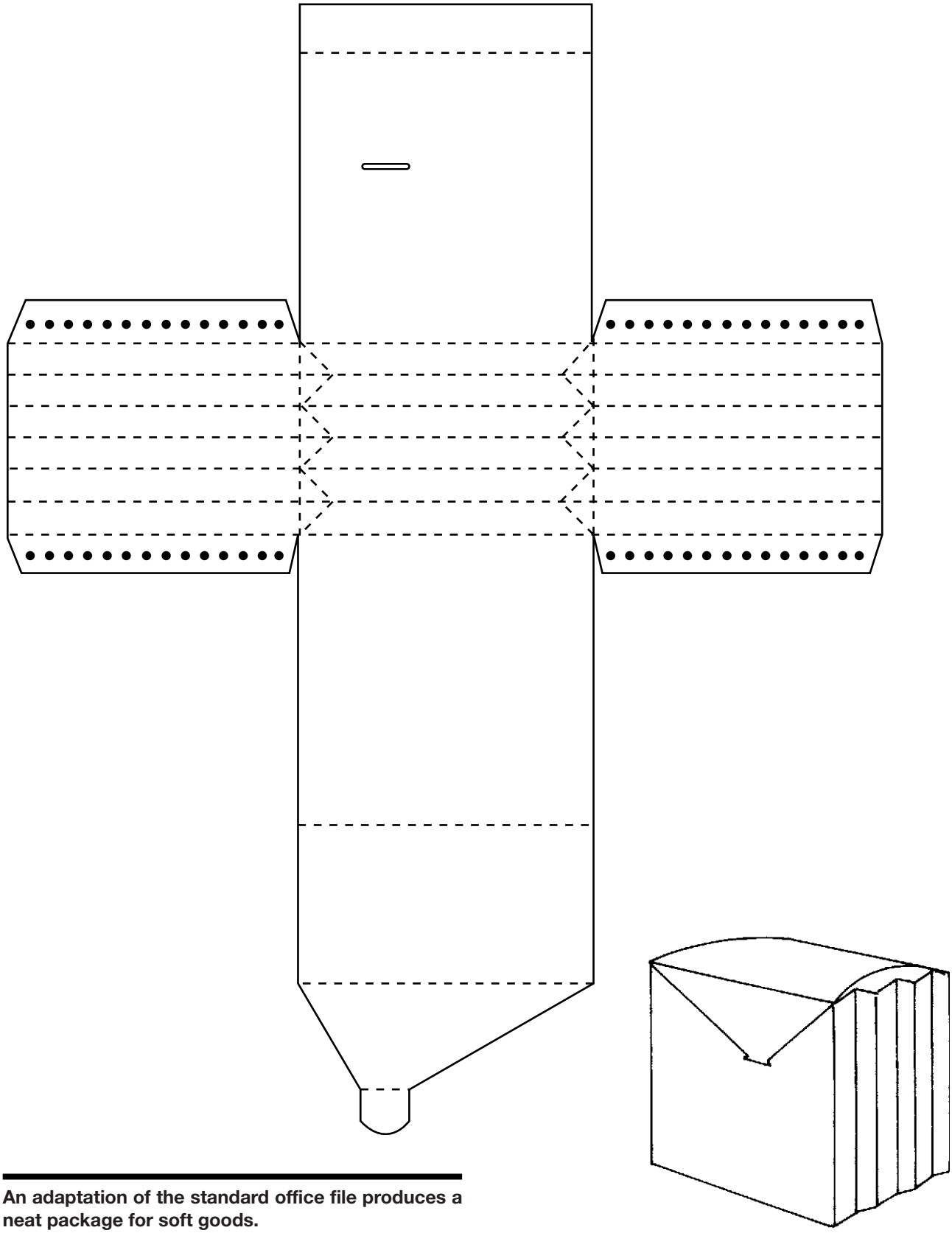




POUCH WITH HIMES LOCK AUTOMATIC BOTTOM, SIDE GUSSETS, AND REINFORCED SNAP-LOCK CLOSURE

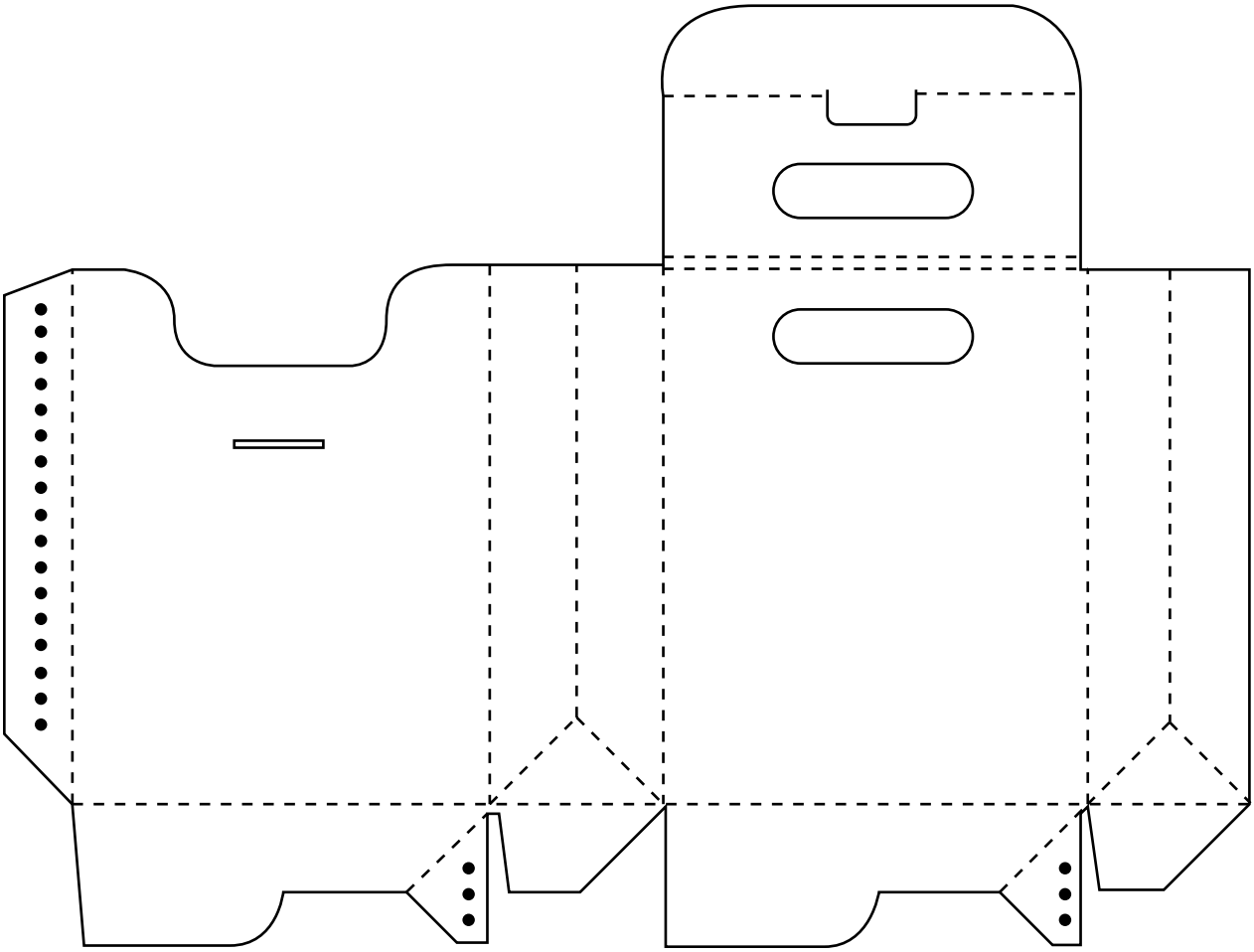


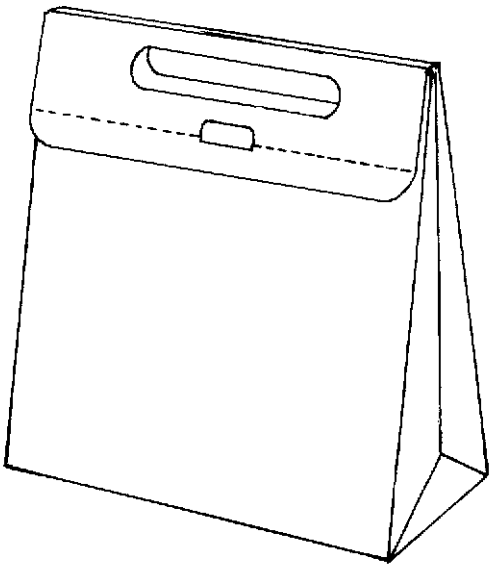


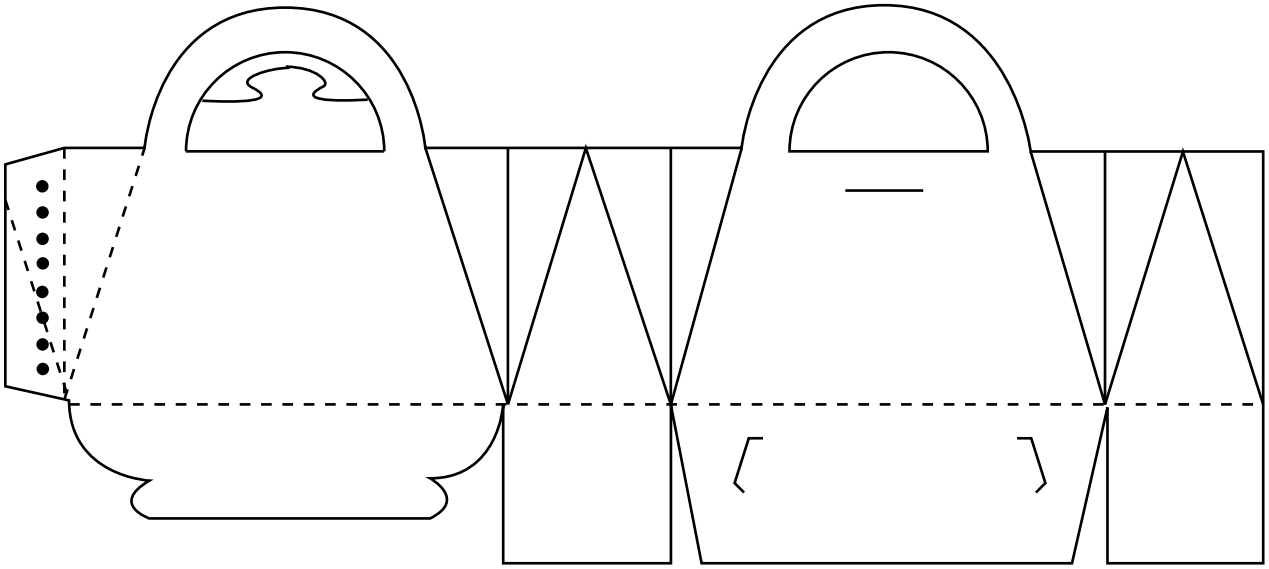


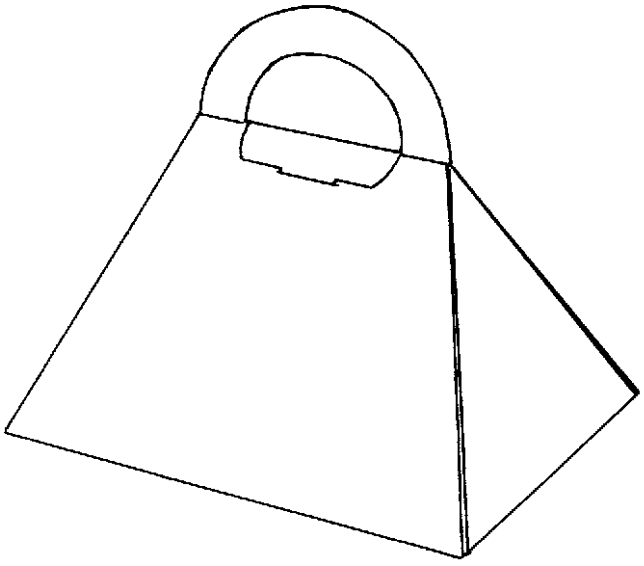
An adaptation of the standard office file produces a neat package for soft goods.

BAG WITH HIMES LOCK AUTOMATIC BOTTOM, GUSSETED SIDES, AND CARRYING HANDLE WITH SNAP-LOCK CLOSURE



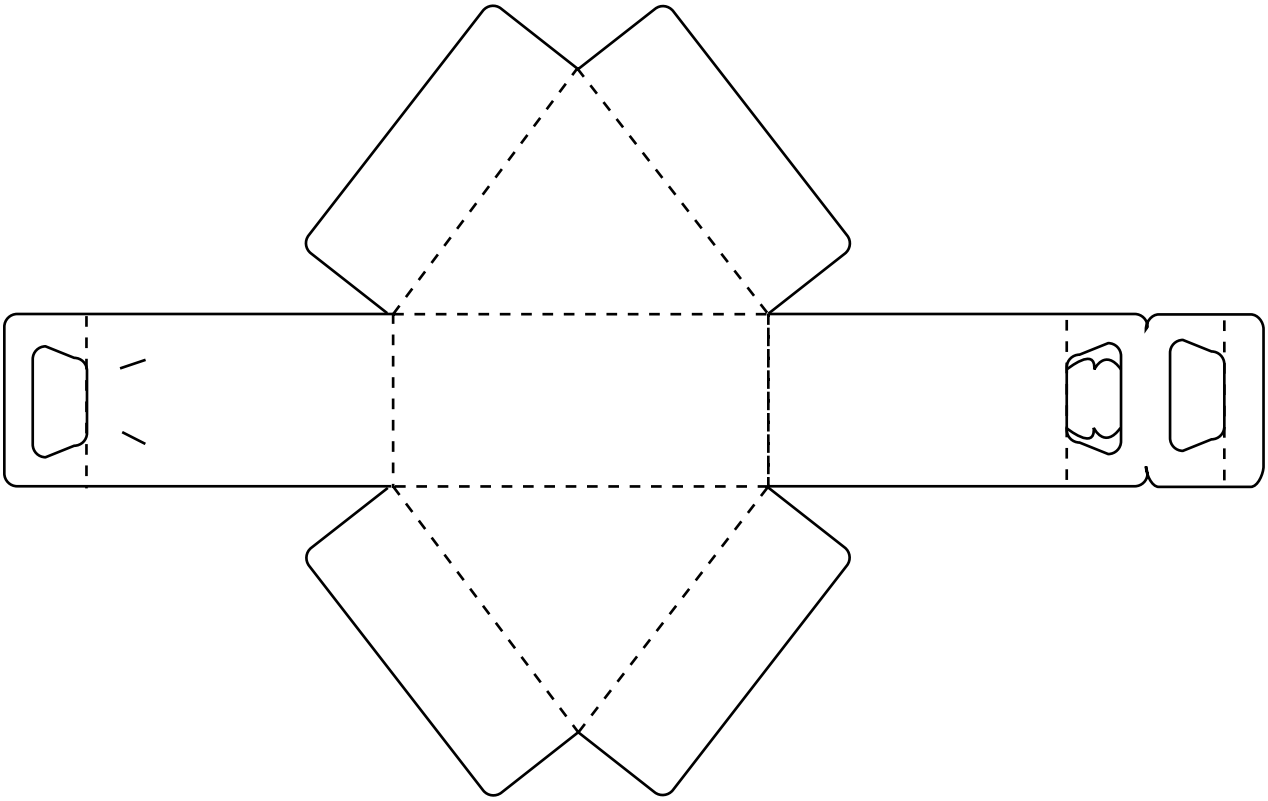




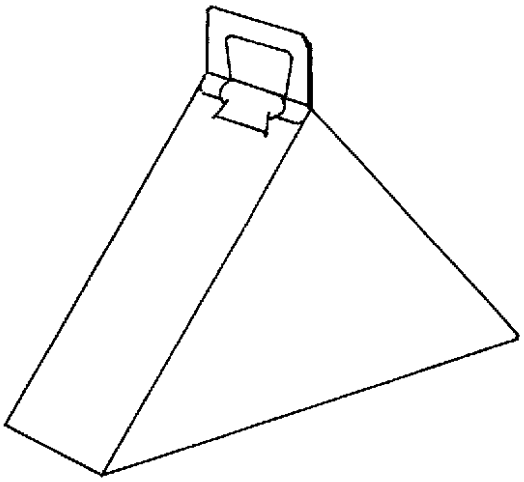


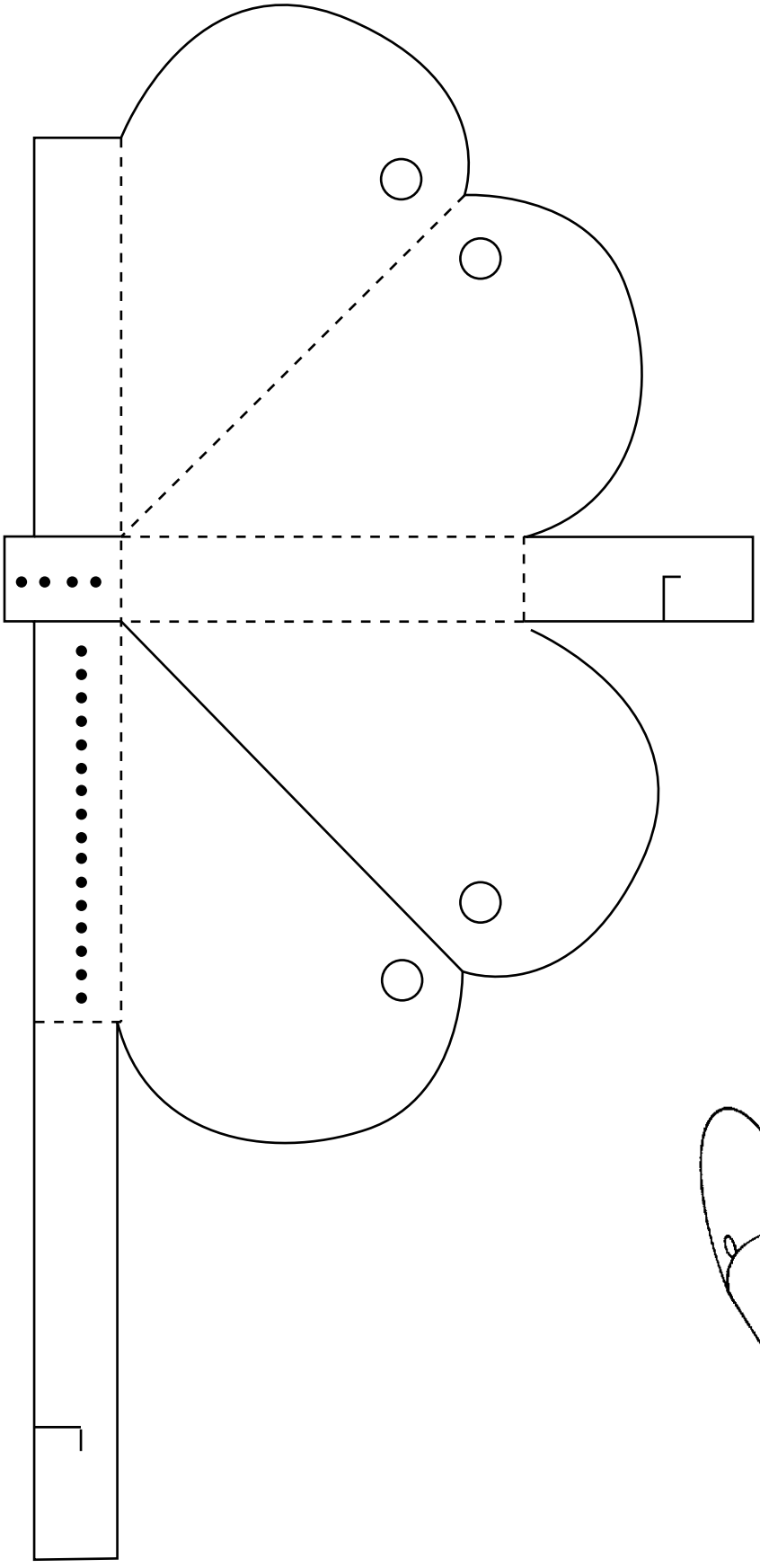
This carrying satchel with double anchor lock bottom and lock-tab/slit top is one of many possible variations.

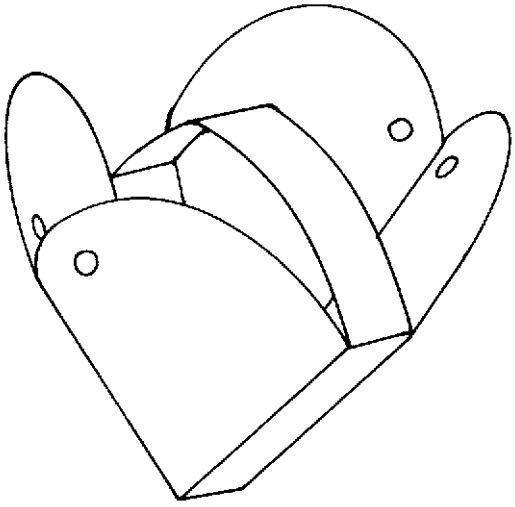
TRIANGULAR CARRYING CASE



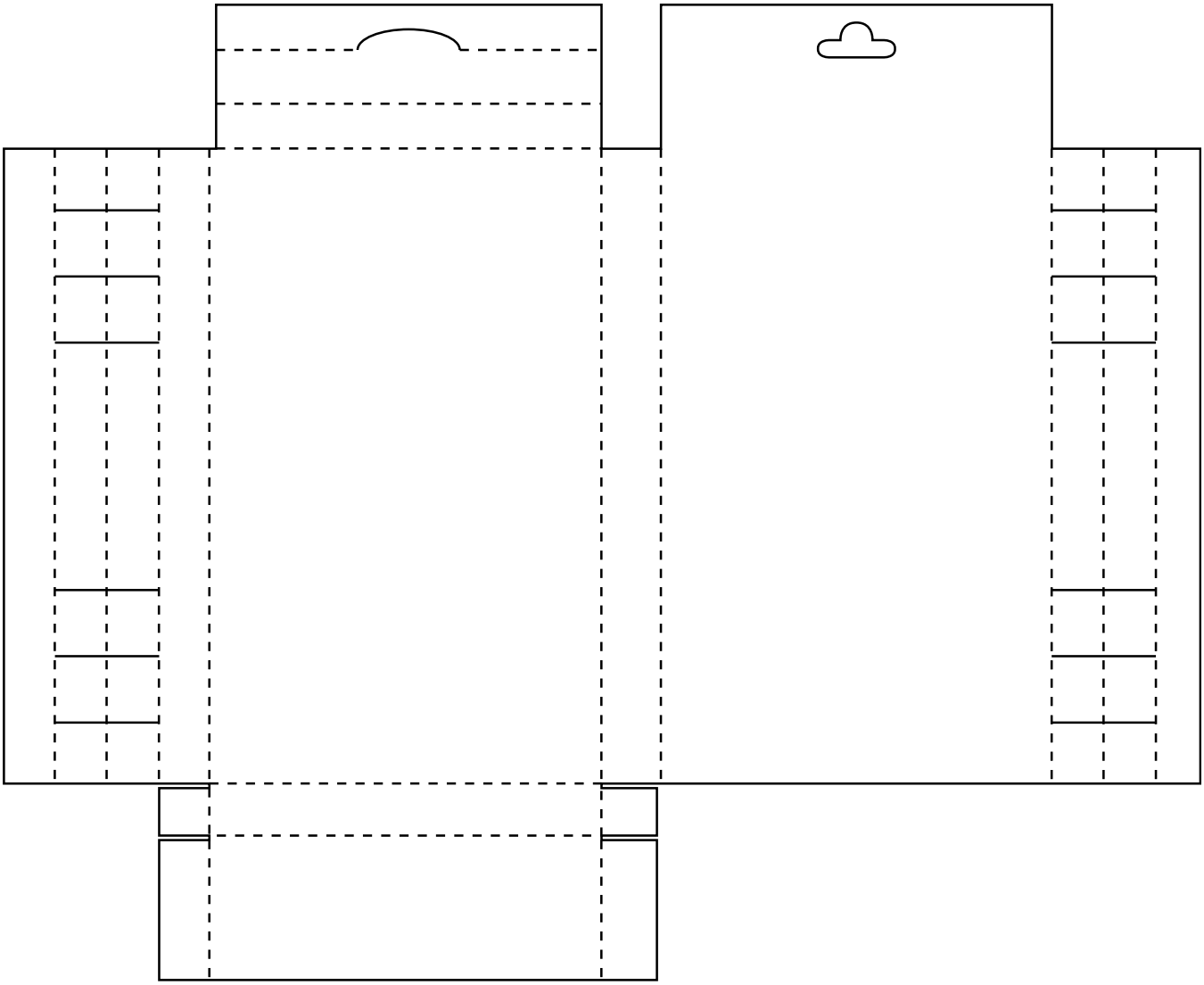
This triangular carry-all needs no glue and may be used for many different gift items.

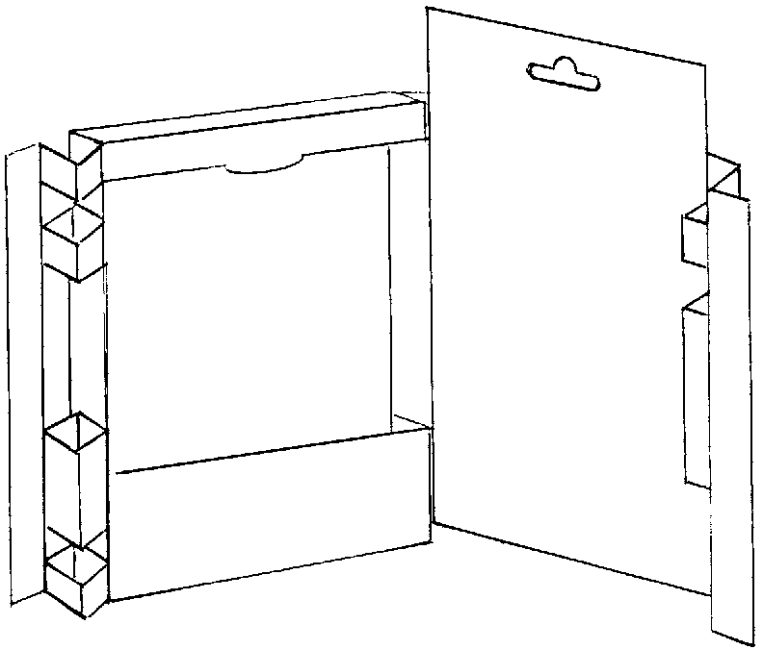






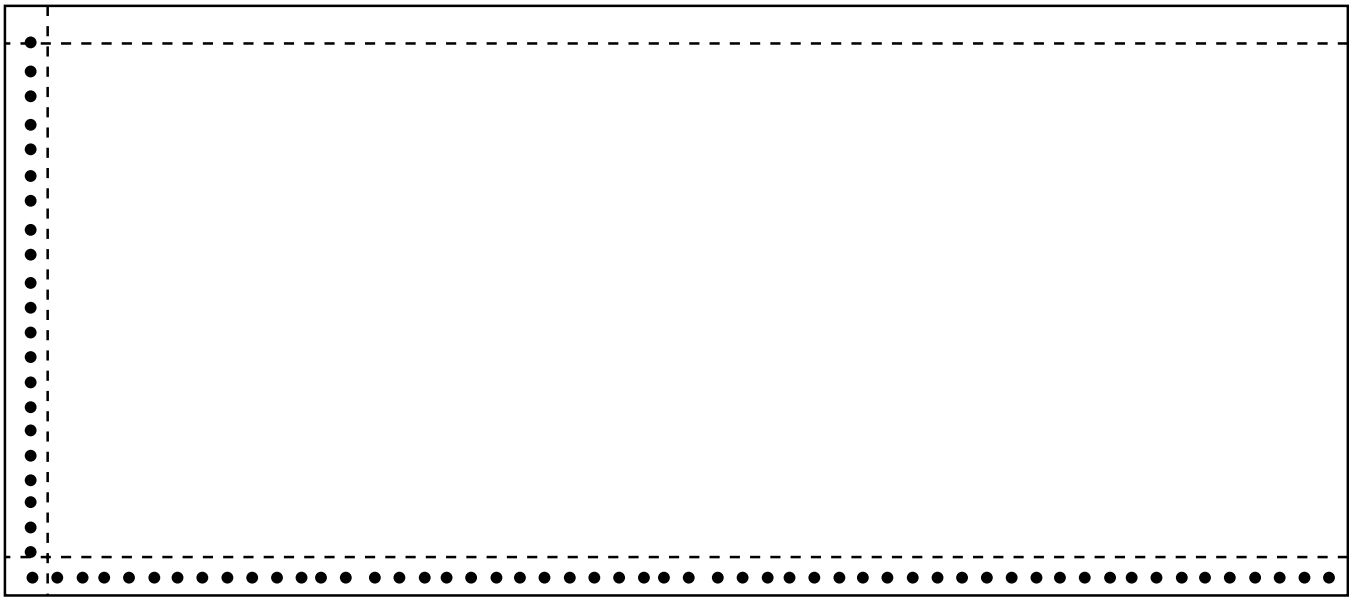
PEN/PENCIL SET WRAP

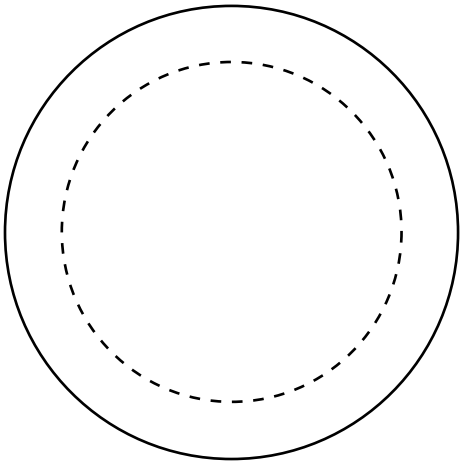


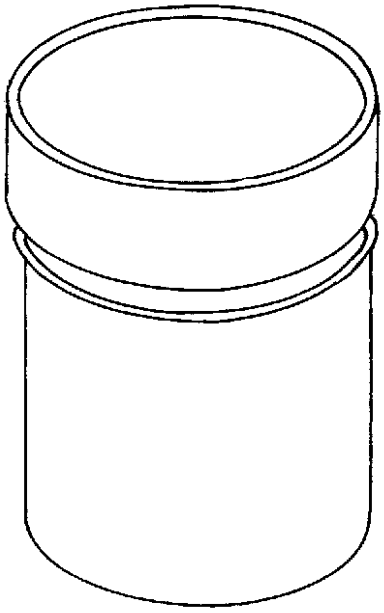


The tabs at the side hold a writing instrument, which serves as a locking device.

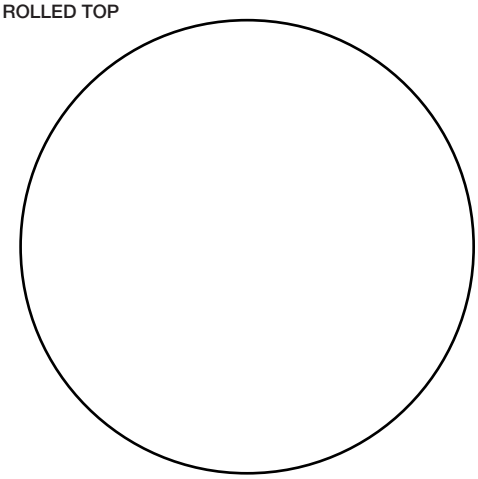
TWO-PIECE, SINGLE-LAP CONTAINER WITH OUTSIDE ROLLED TOP AND INSIDE FOLDED BOTTOM

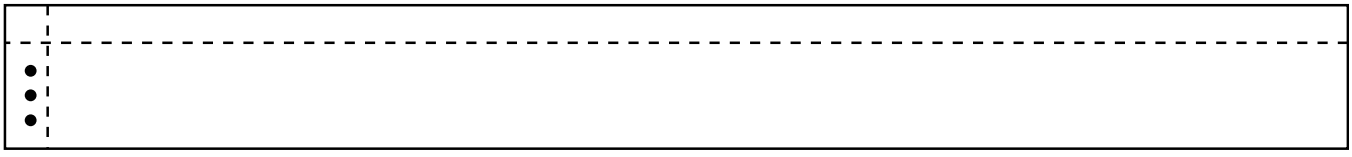




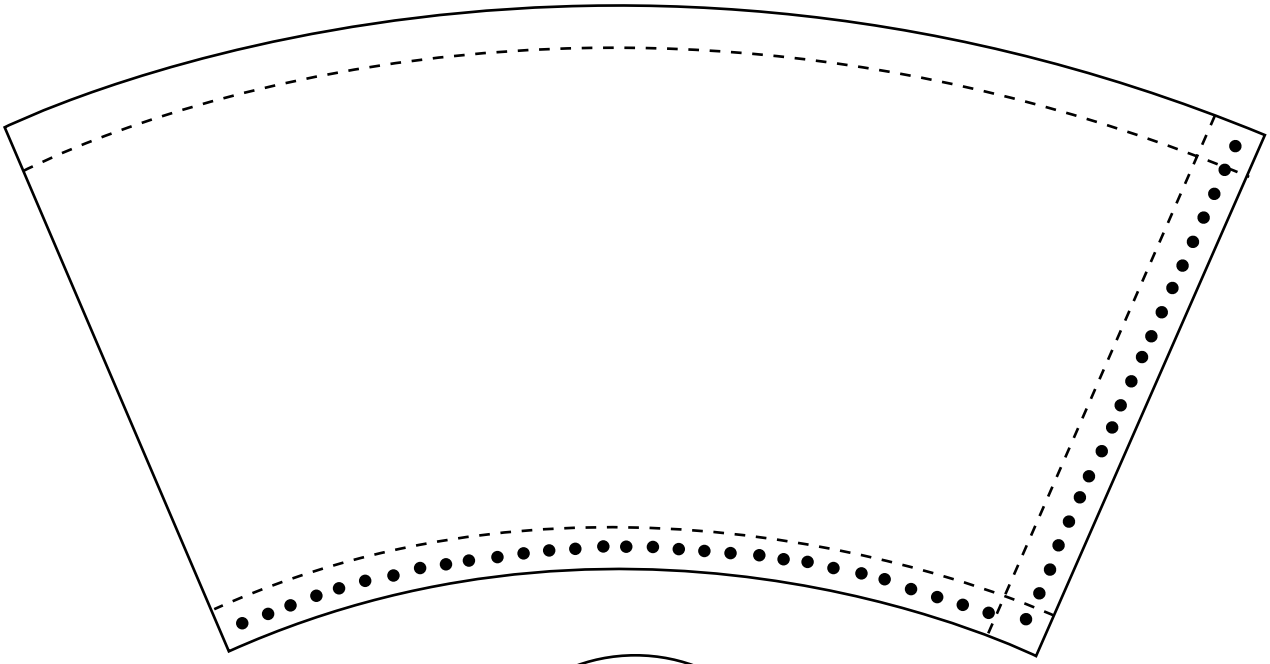


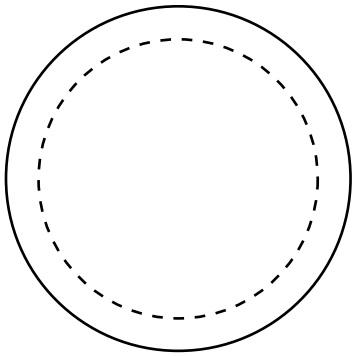
TWO-PIECE, SINGLE-LAP CONTAINER LID WITH INSIDE ROLLED TOP

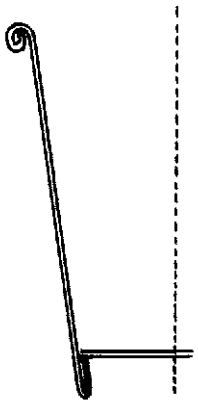


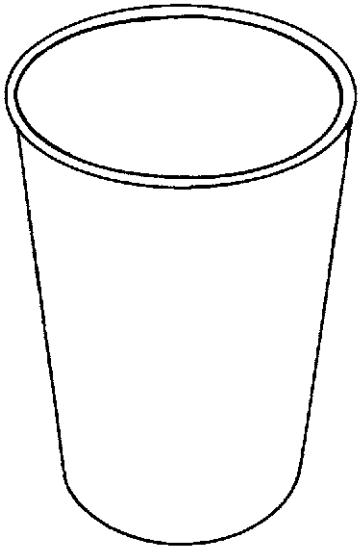


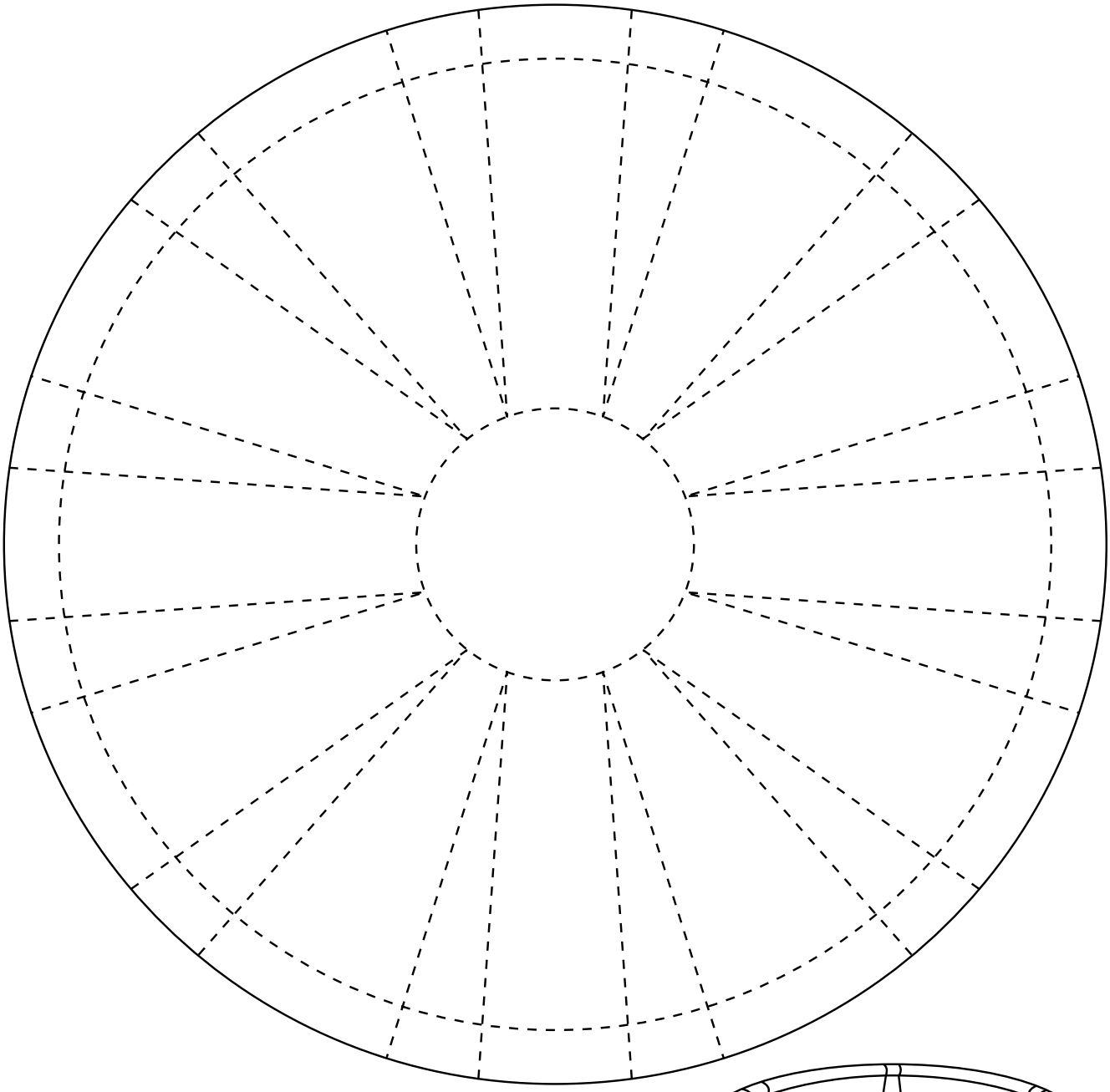
TWO-PIECE, SINGLE-LAP, TAPERED CUP WITH INSIDE FOLDED BOTTOM AND OUTSIDE ROLLED TOP

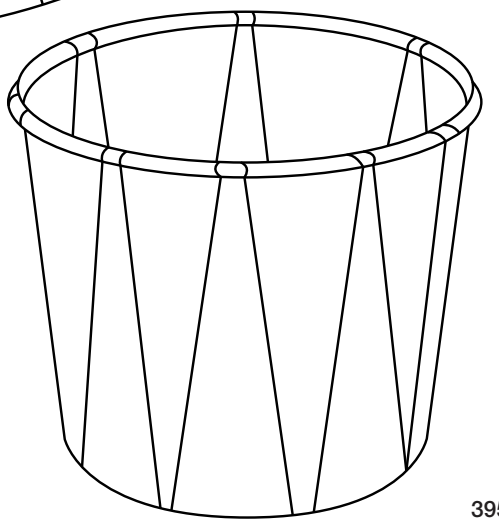




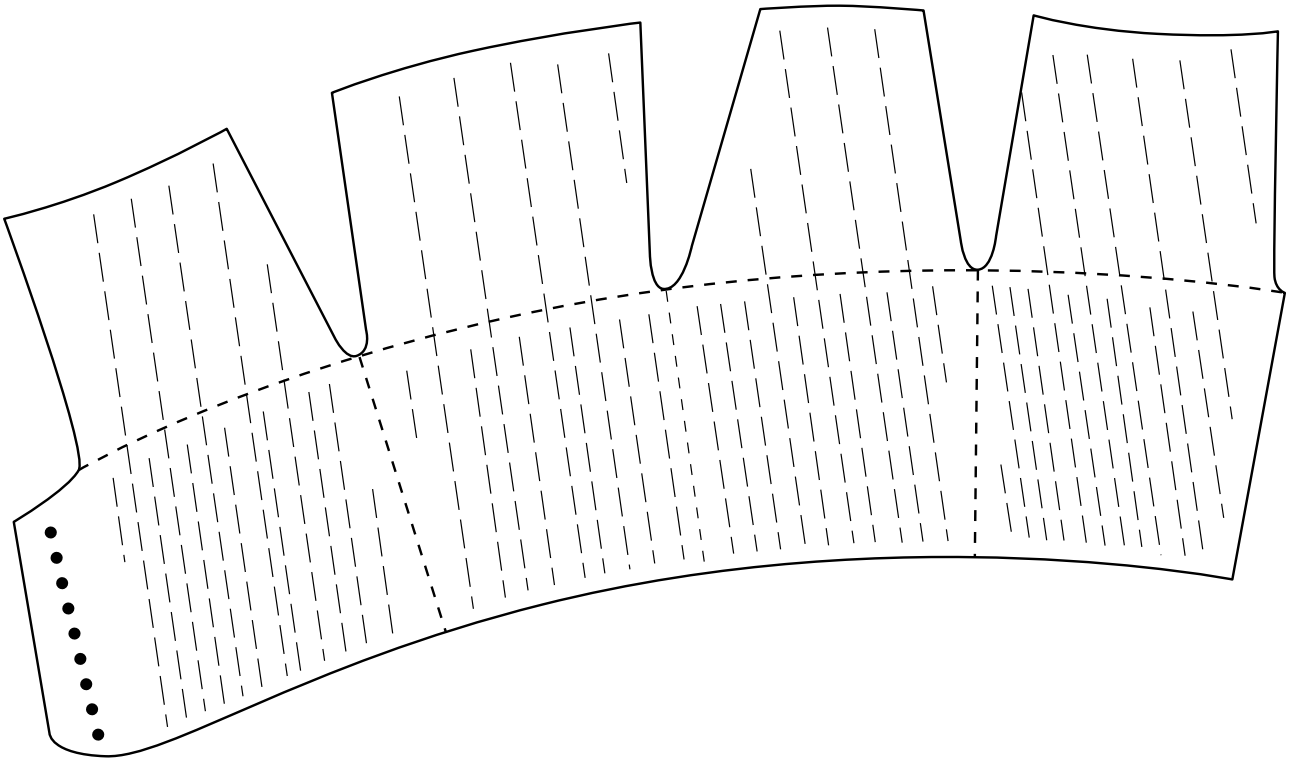




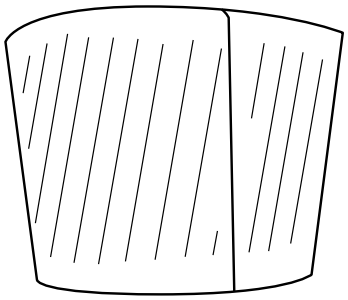


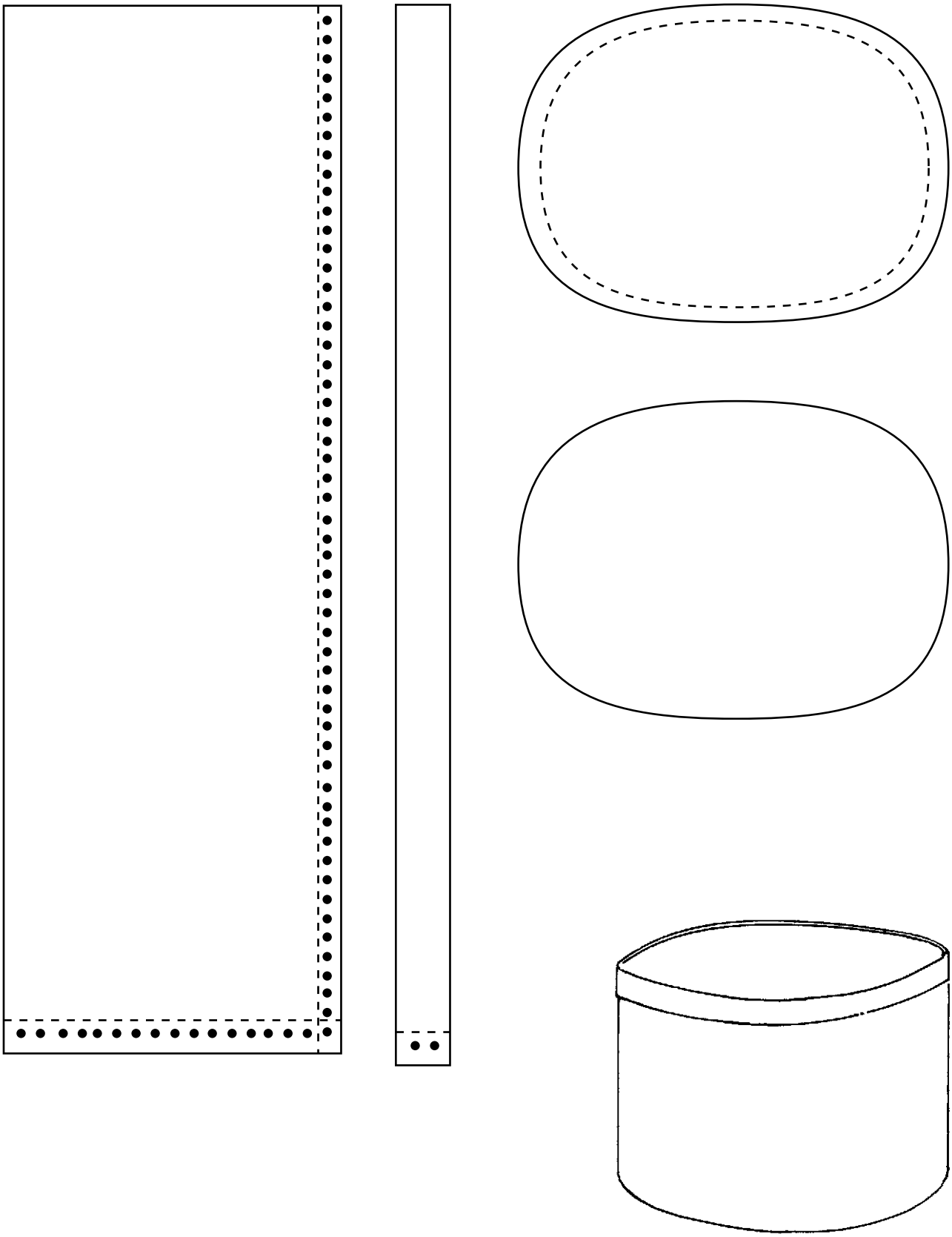


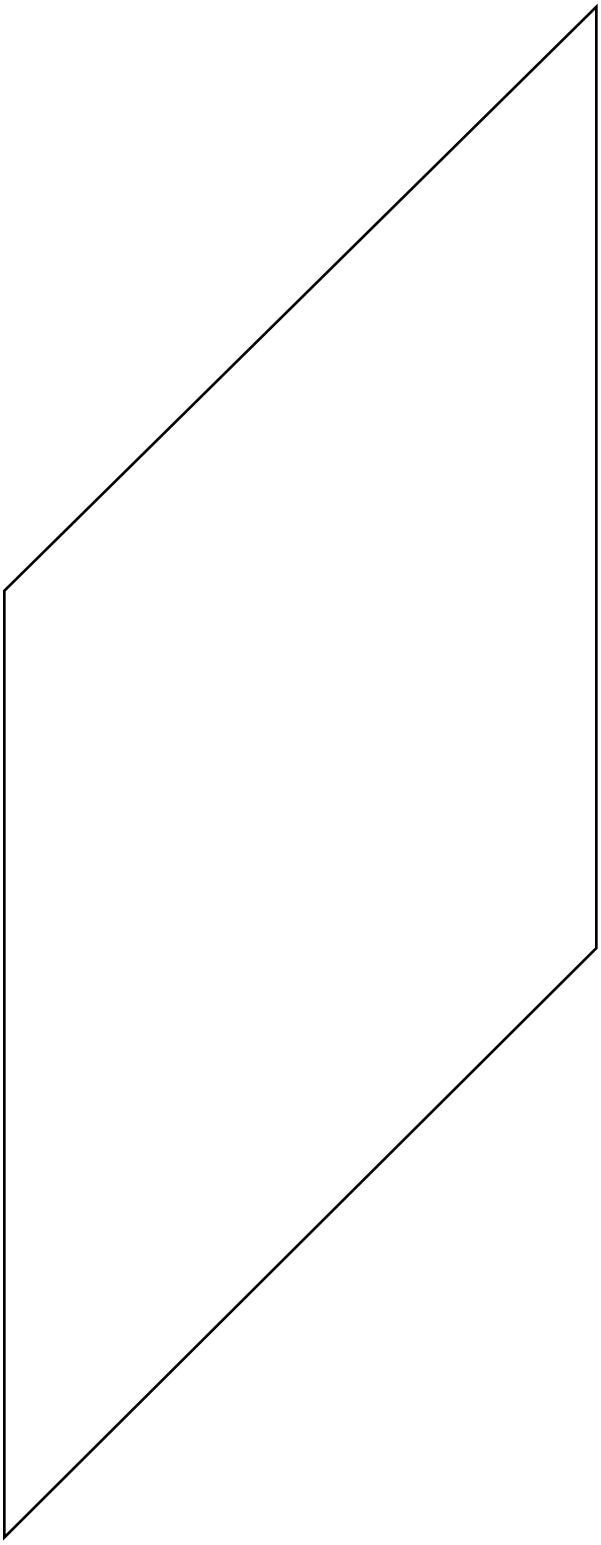
HOT BEVERAGE CUP HOLDER



Made from kraft paper with many scores to absorb the heat of the beverage



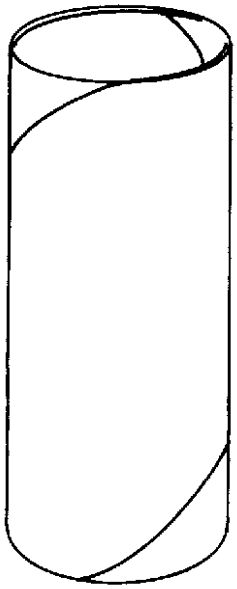


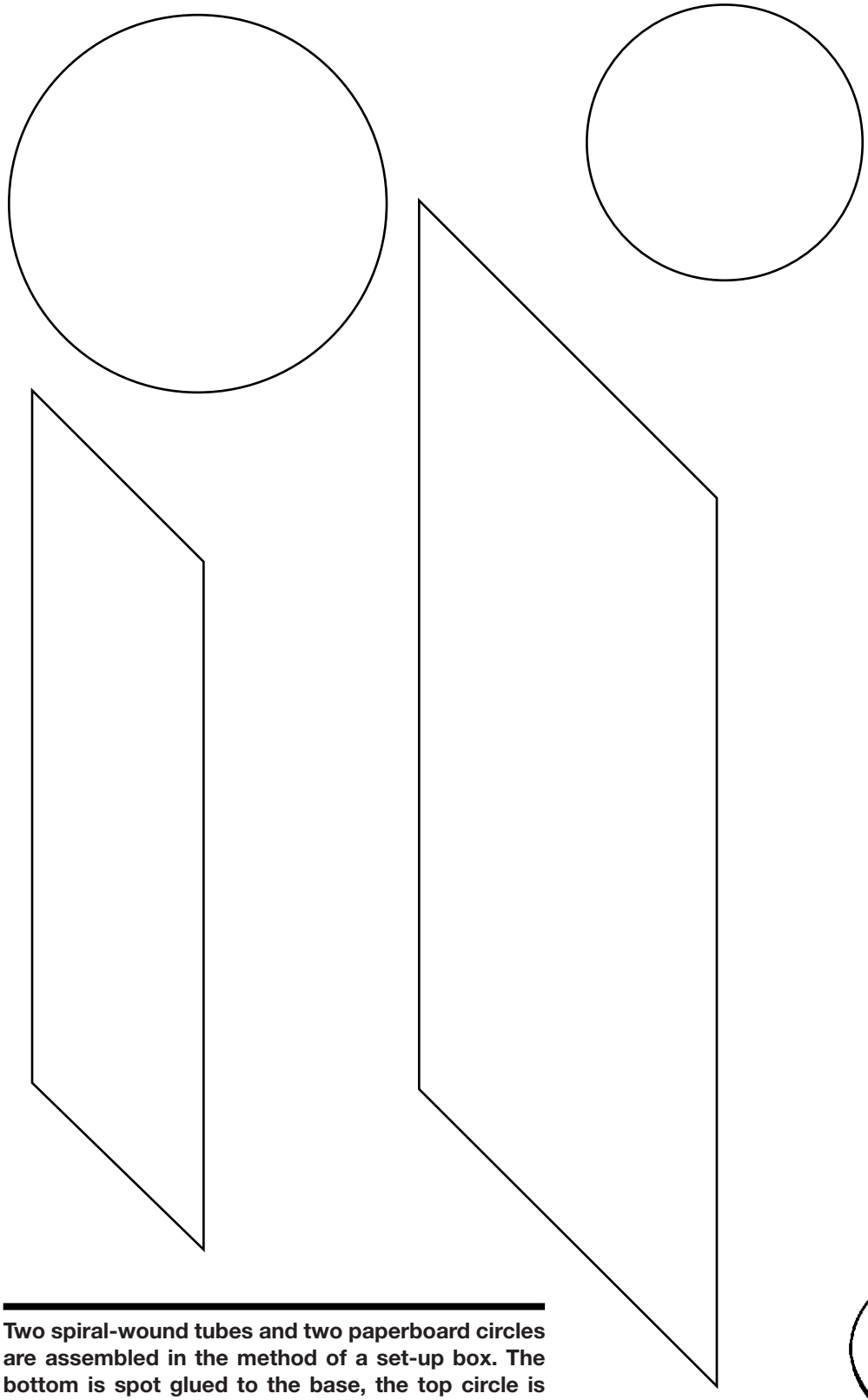


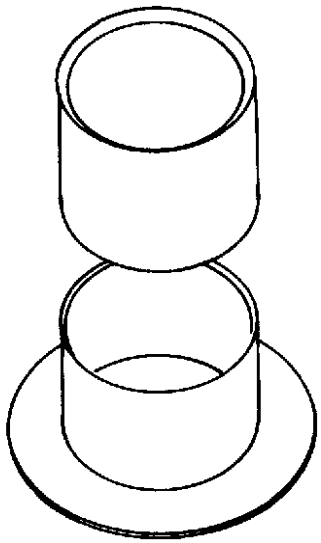
Used predominantly as the core for rolls of paper and mailing tubes.

Spiral-wound tubes may be used as the basis for circular packaging.

Cosmetics and toiletries often make use of this form. The following page shows the use of a tube as the core of a novelty package.

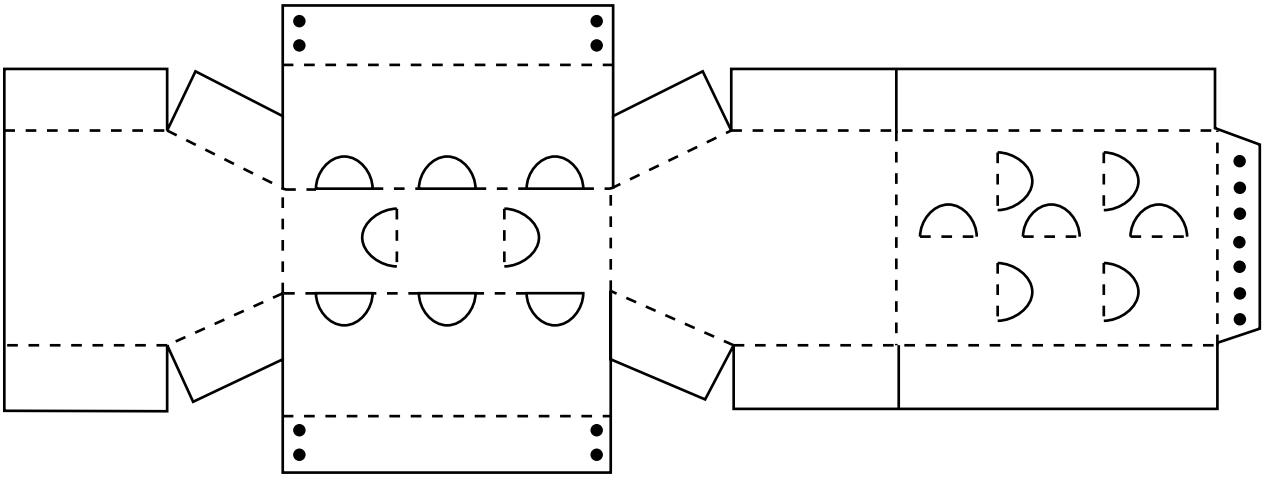


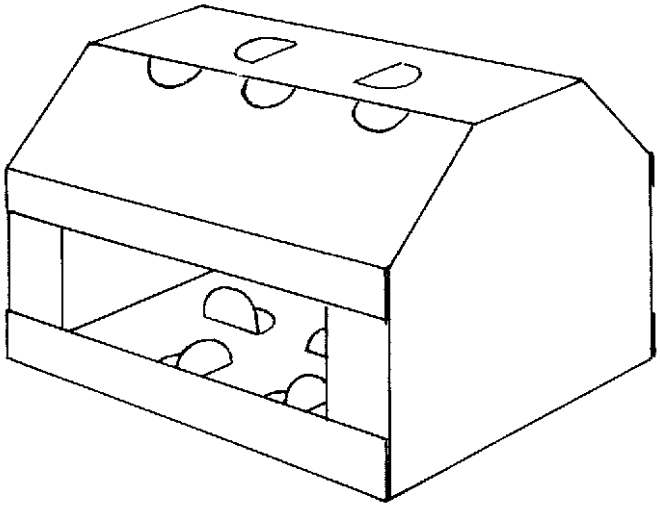




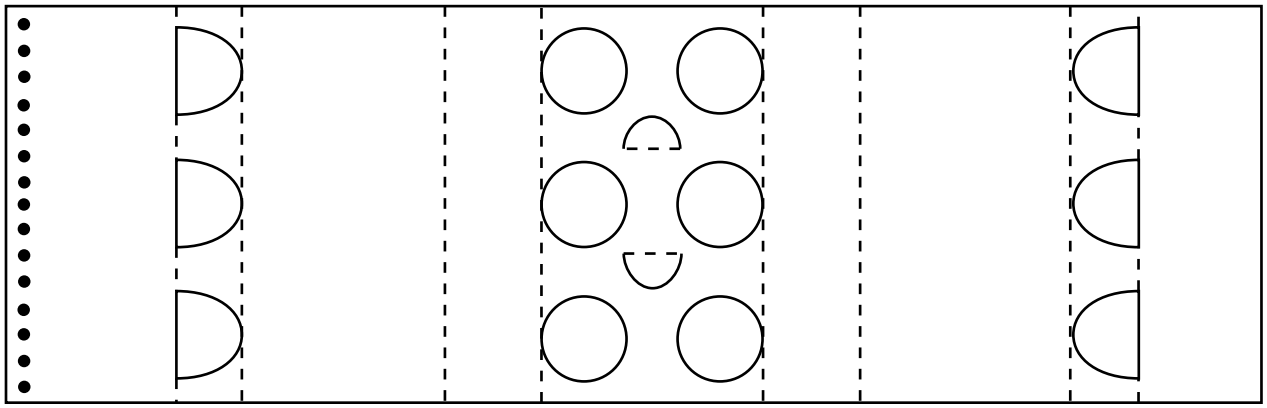
Two spiral-wound tubes and two paperboard circles are assembled in the method of a set-up box. The bottom is spot glued to the base, the top circle is inside-rolled. The slightly larger tube slides over the bottom to create a top-hat.

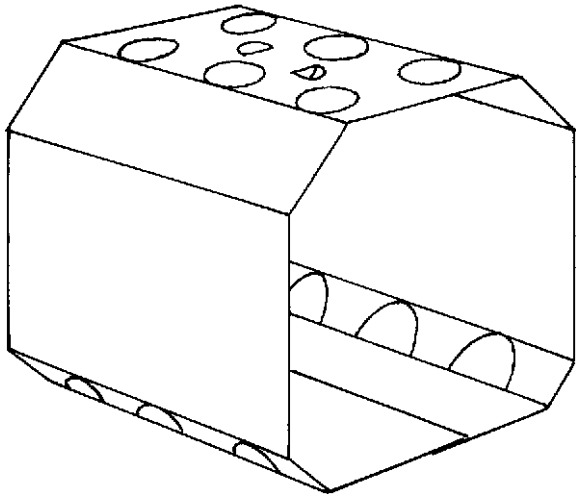
SIDE-LOADED TUBE STYLE SIX-BOTTLE CARRIER



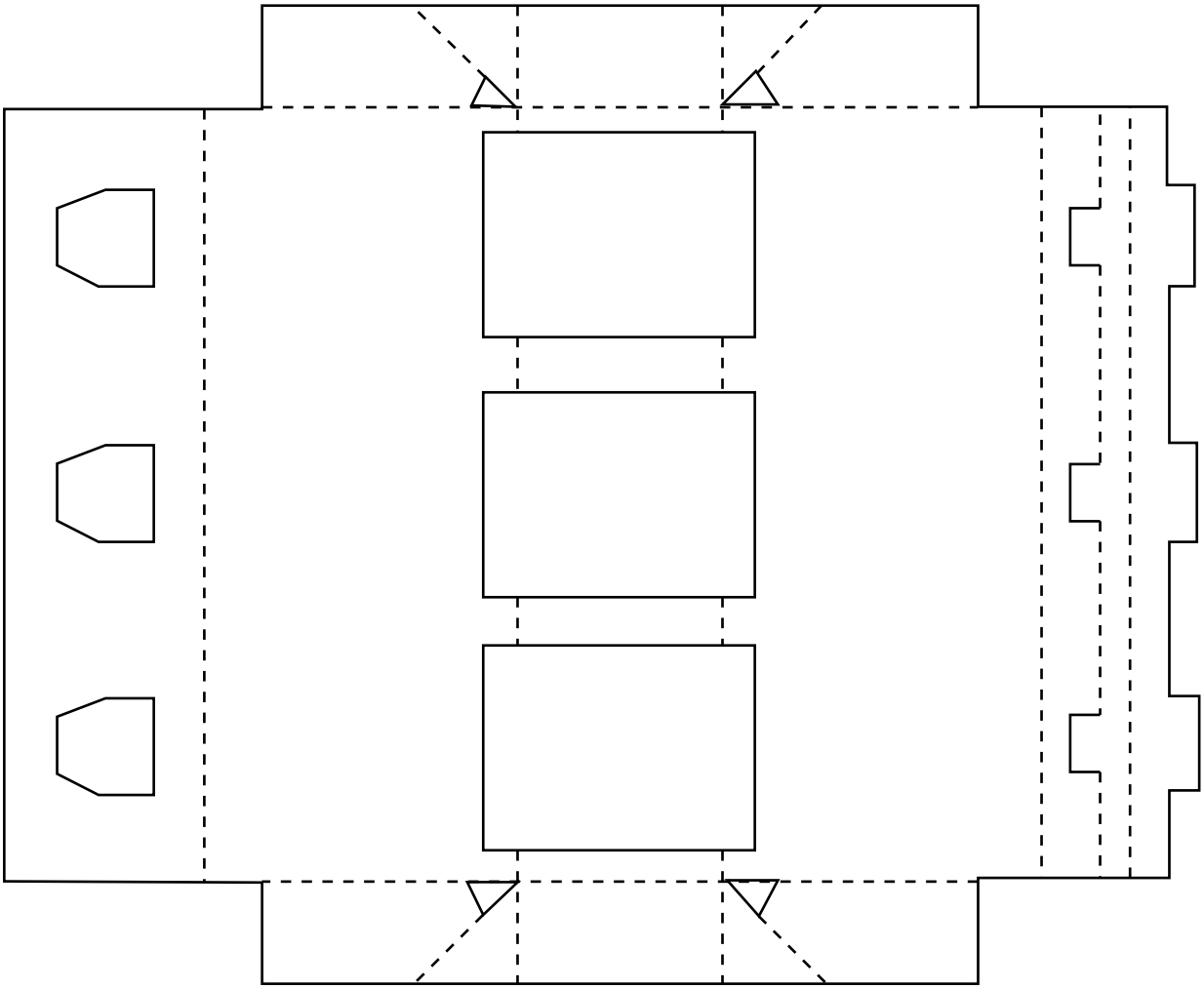


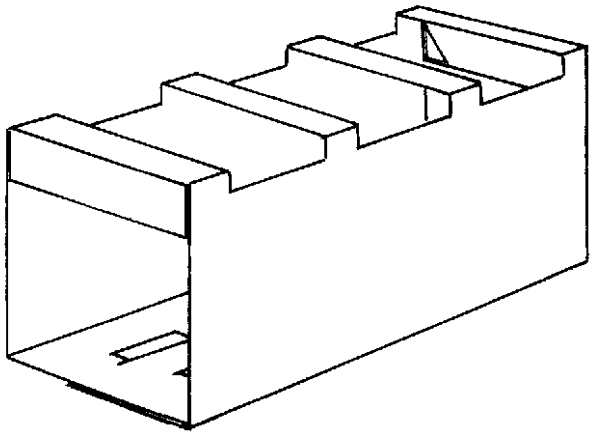
BOTTOM-GLUED SLEEVE WITH NECK AND HEEL APERTURE; NECK-THROUGH STYLE

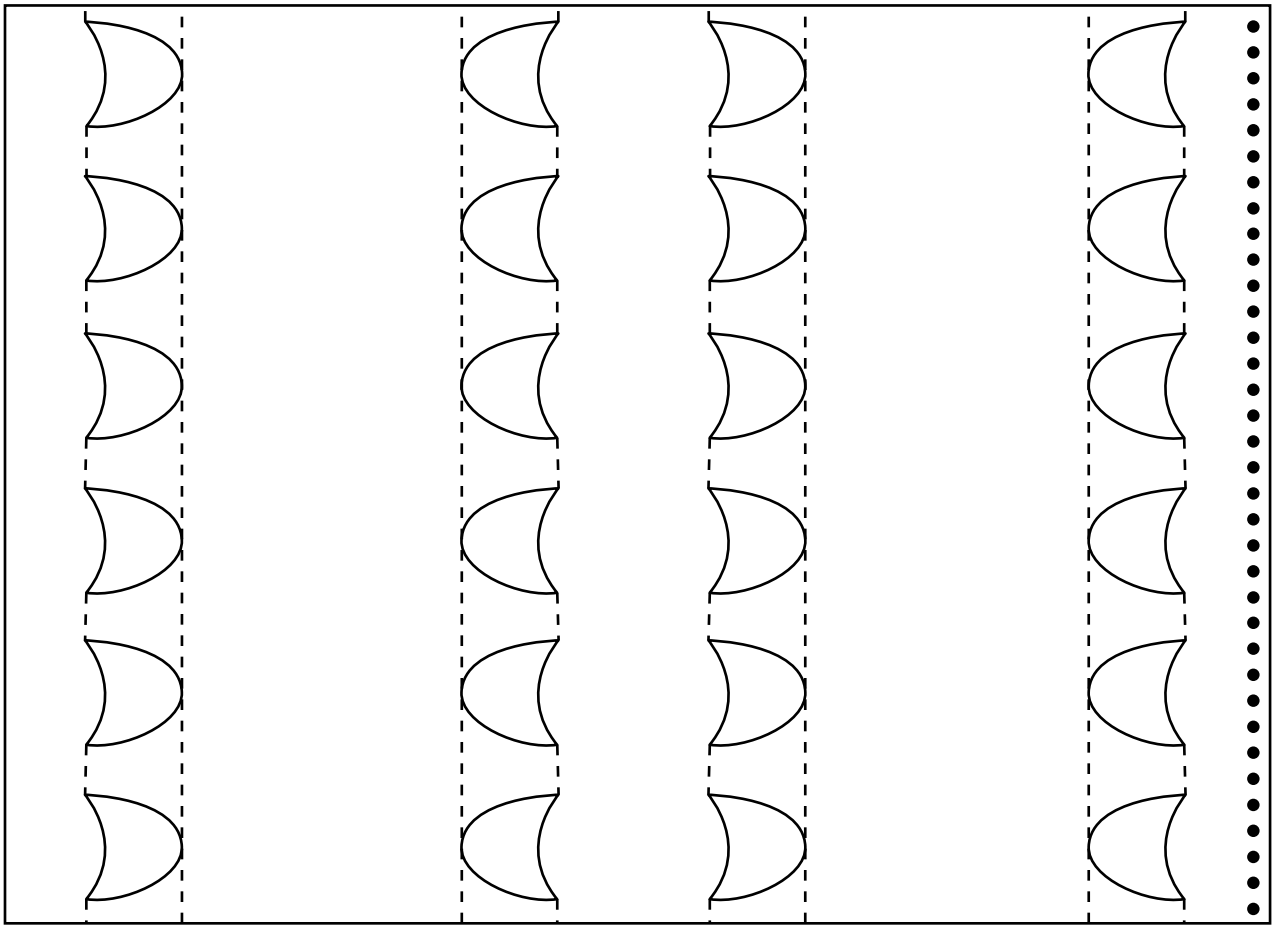


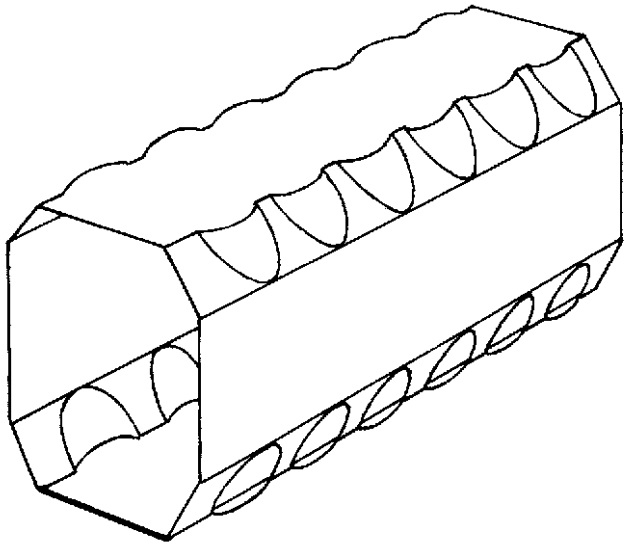


SLEEVE-STYLE THREE-COUNT MULTIPACK ACE LOCK BOTTOM

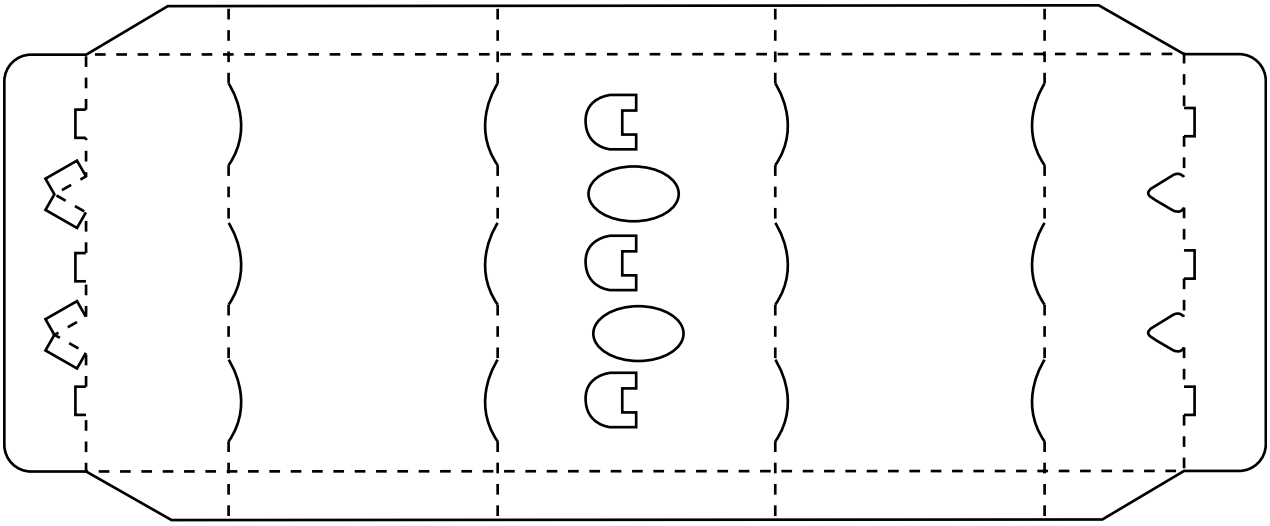


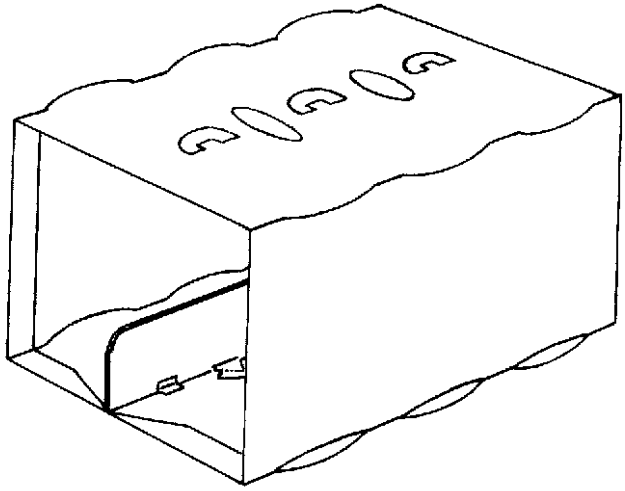


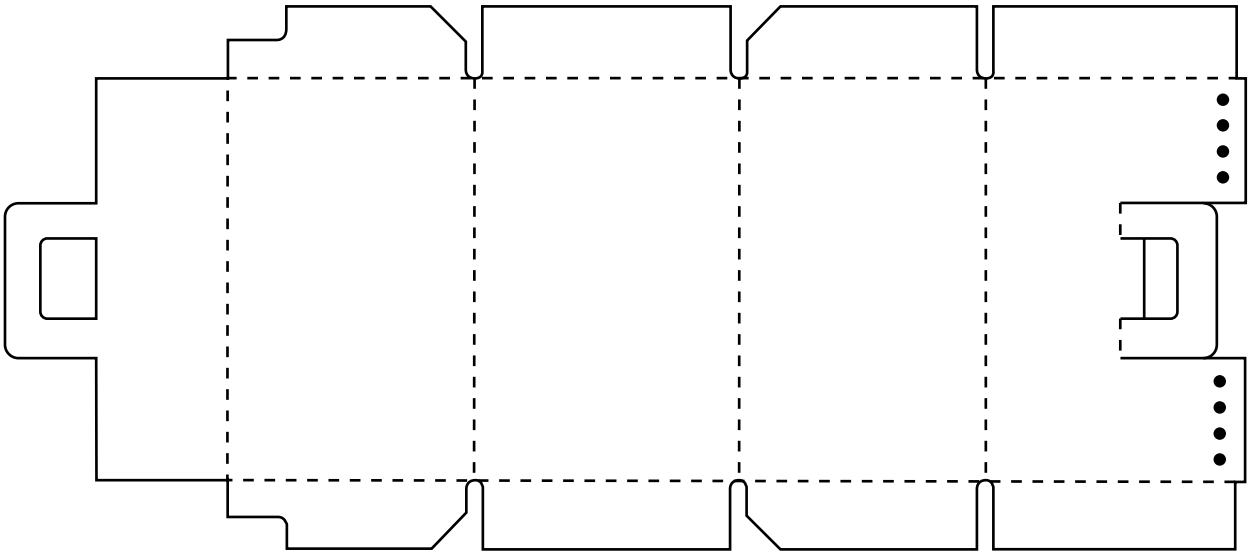


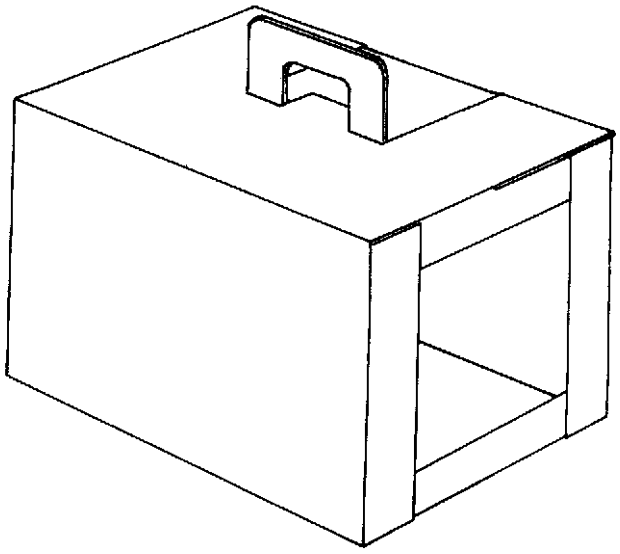


ANDRE-MATIC CAN CARRIER WITH HEMMED EDGE

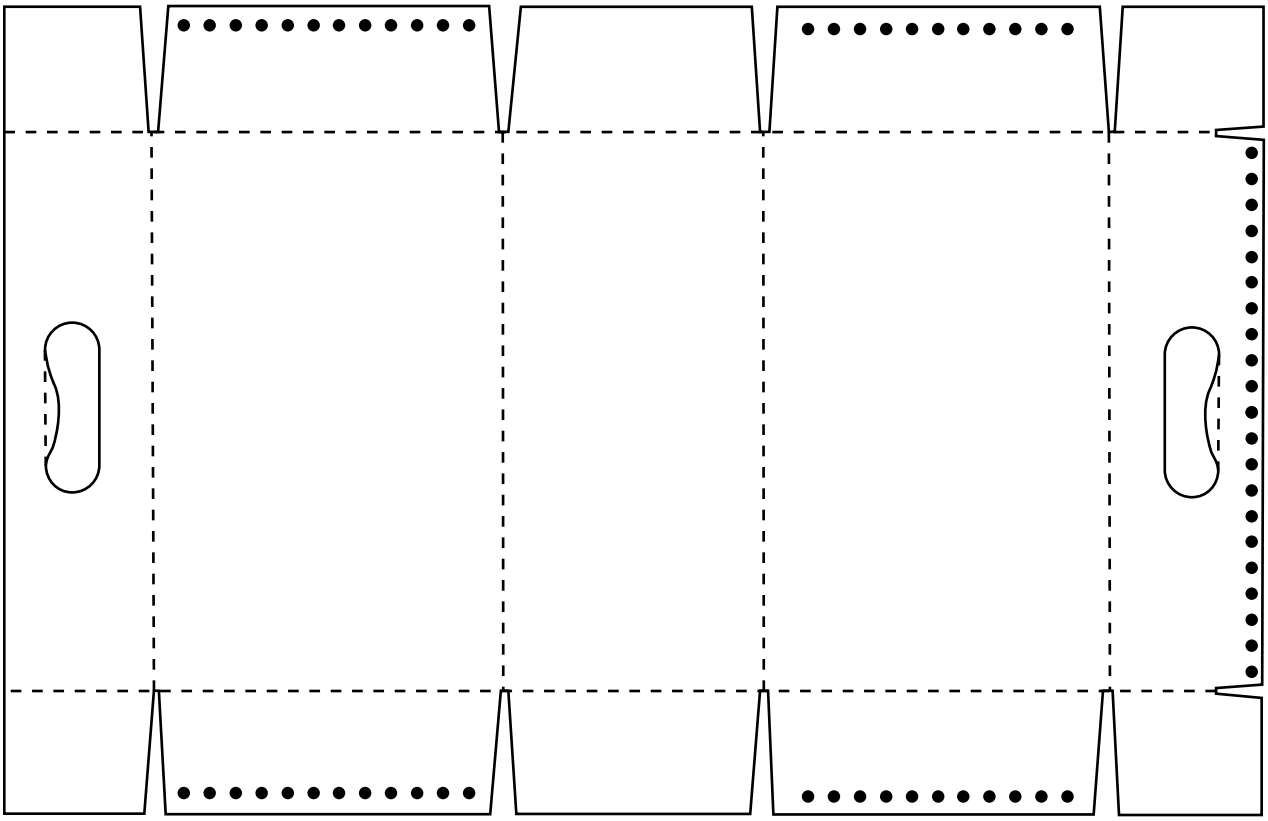


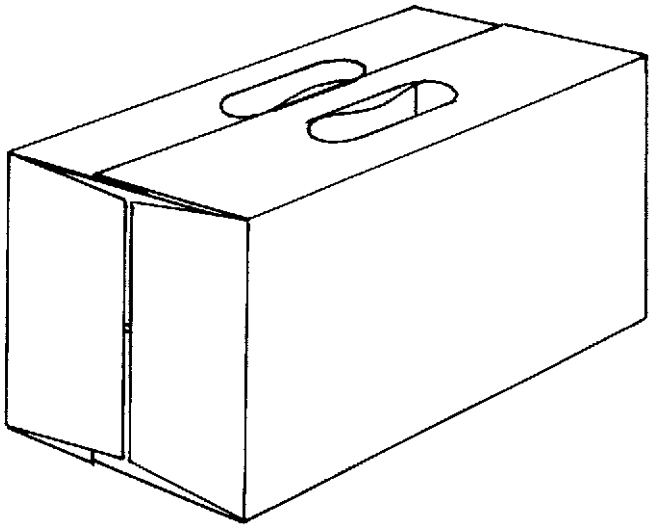




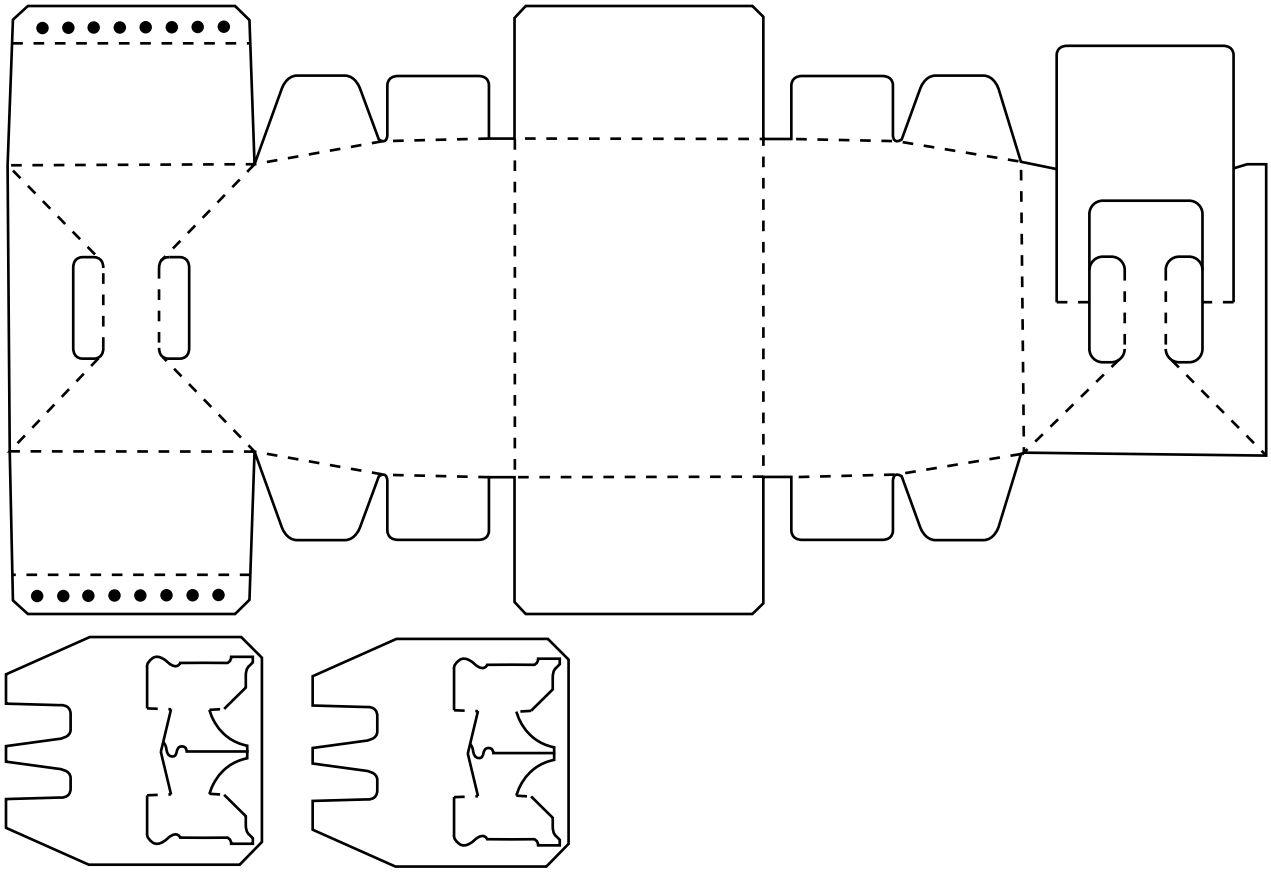


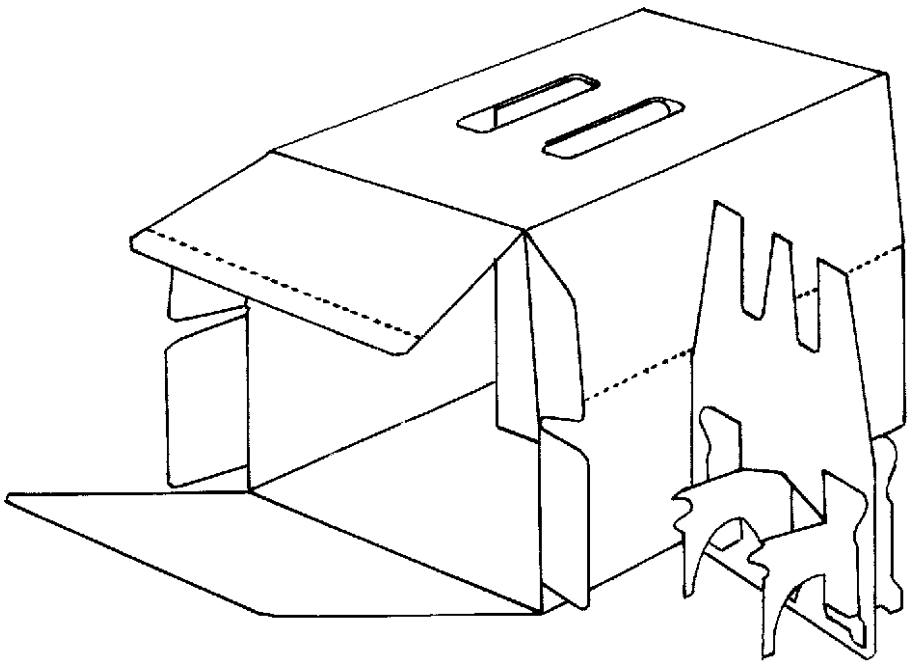
END-LOADED TUBE WITH REINFORCED HANDLE



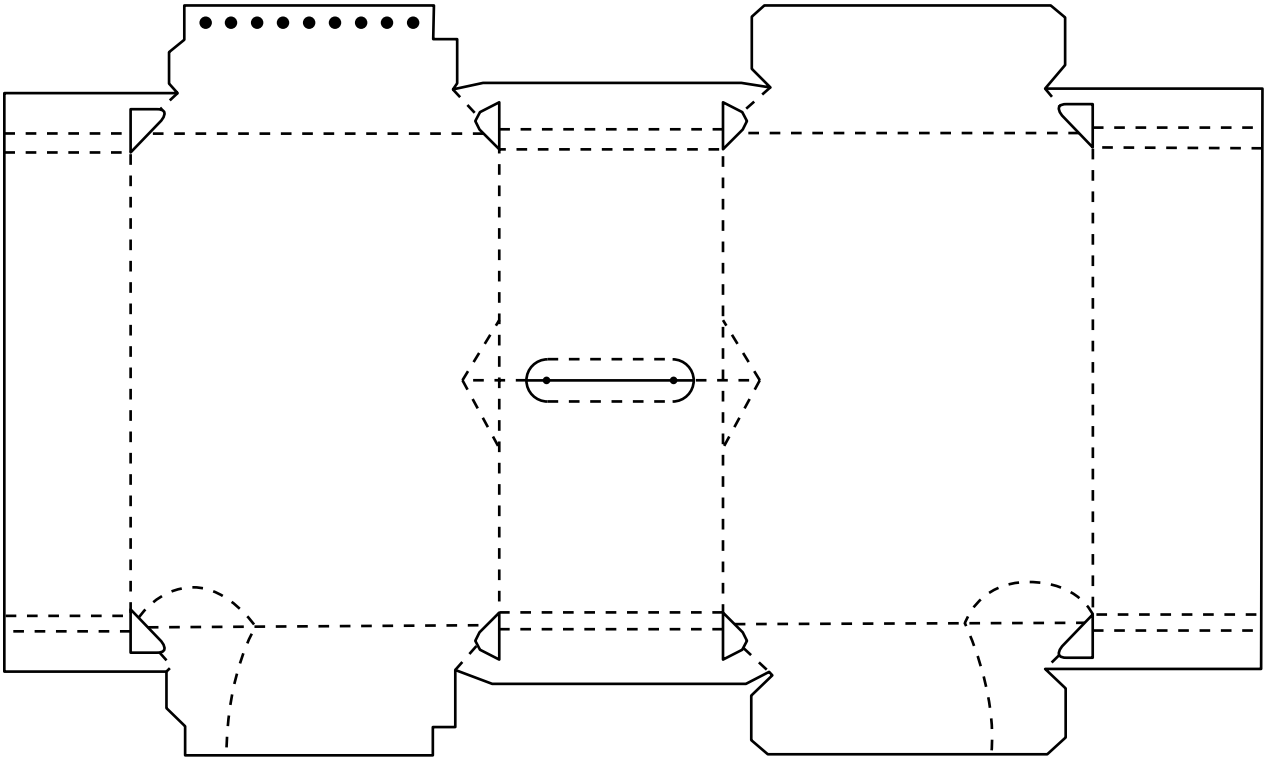


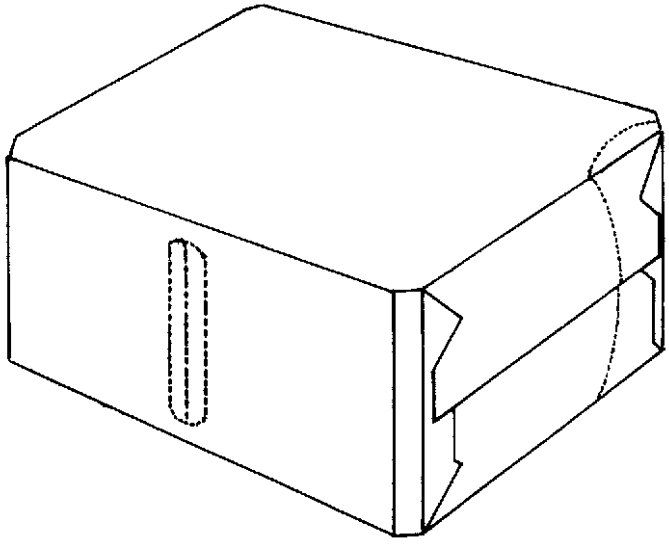
END-LOADED BOTTLE CARRIER WITH TAPERED SIDES, REINFORCED HANDLE, AND SEPARATE INSERTS



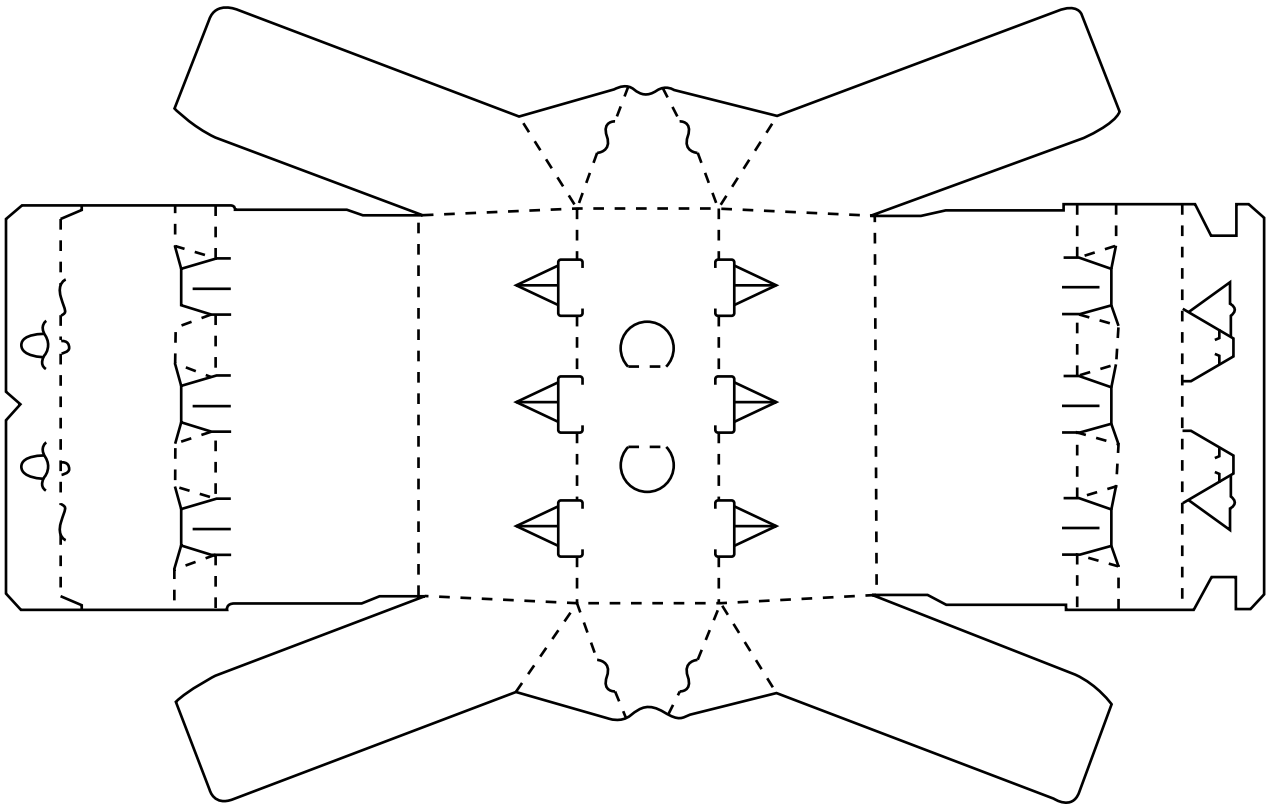


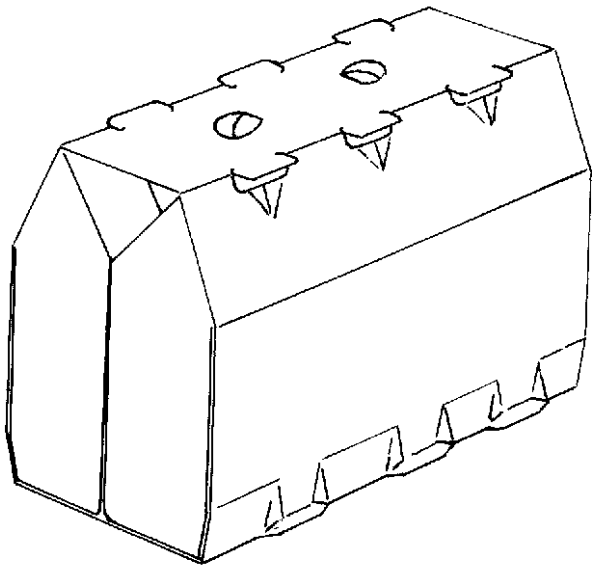
TWELVE-COUNT CAN CARRIER WITH PRE-PERFORATED TEAR-OPEN STRIP
(PAT. #3,955,740)

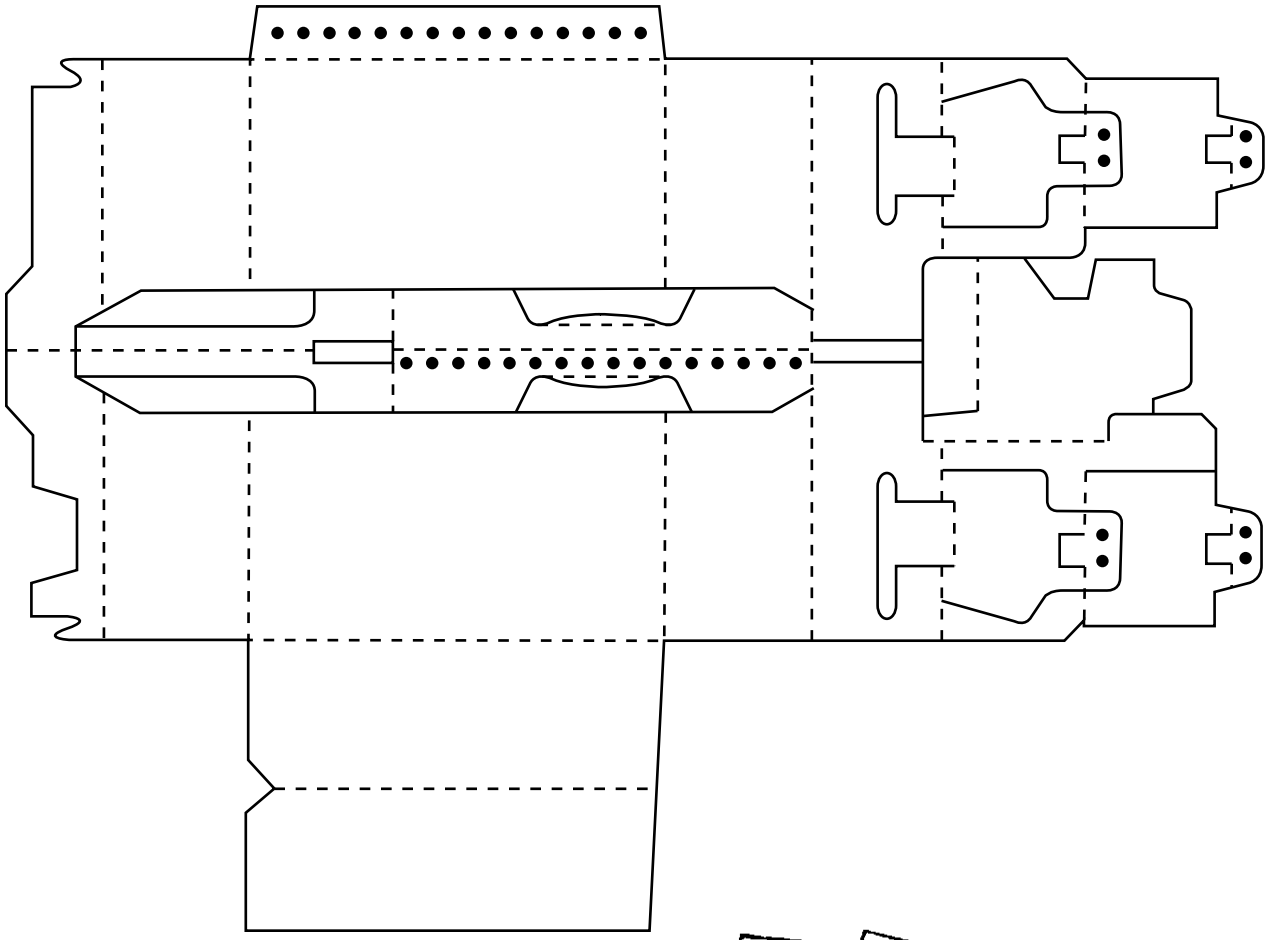


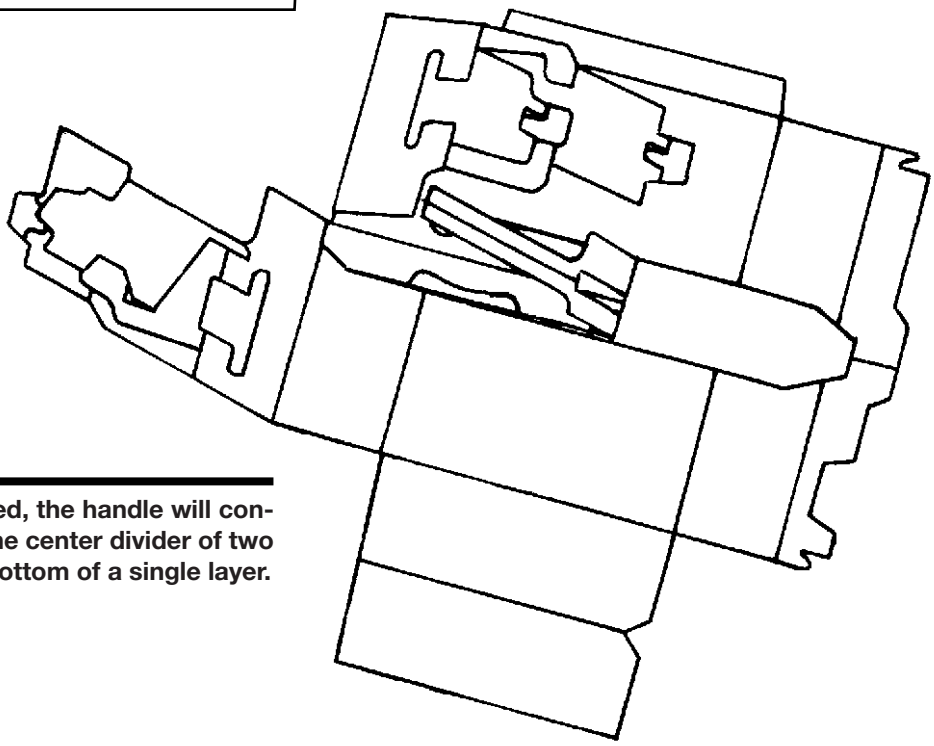


SIX-BOTTLE WING-LOCKED SLEEVE WITH TOP AND BOTTOM CHIME LOCKS

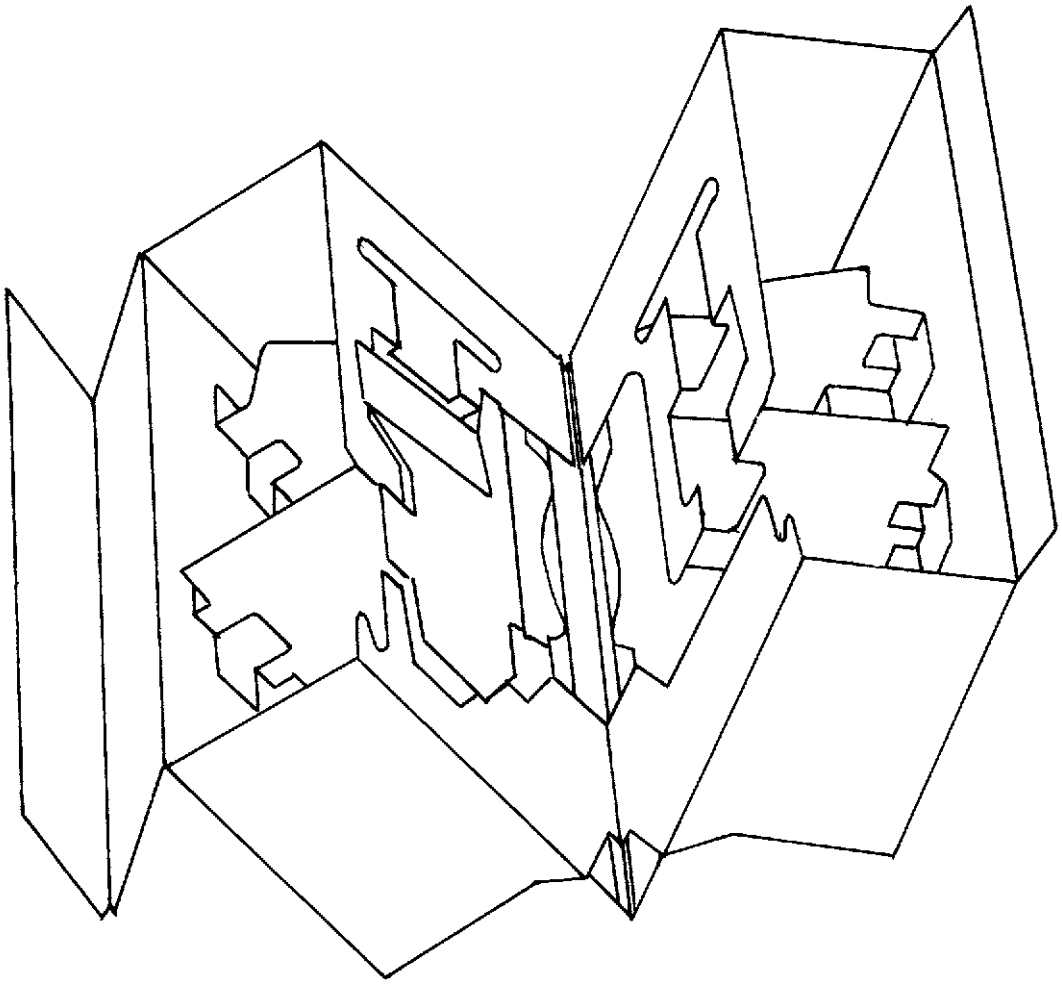


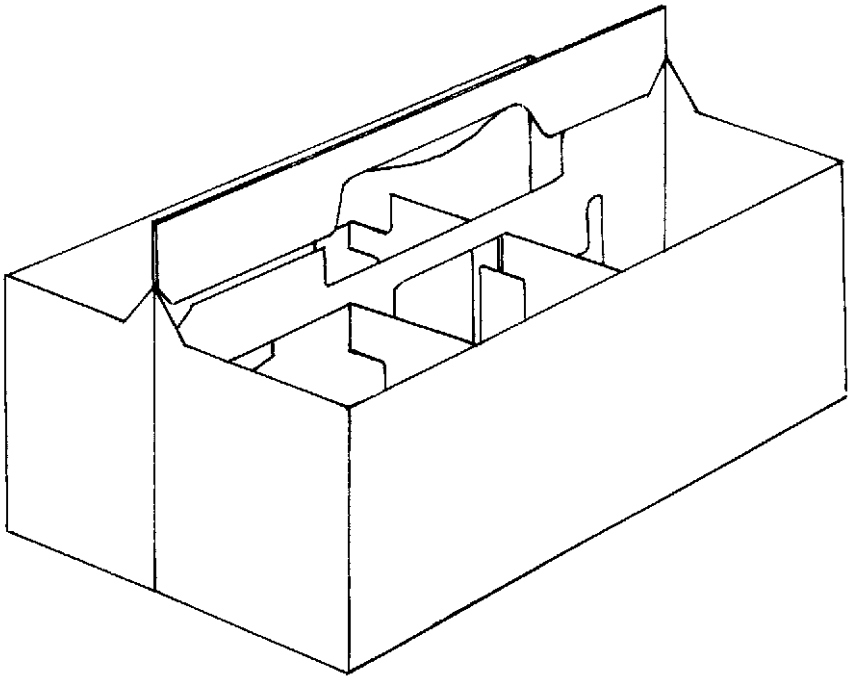




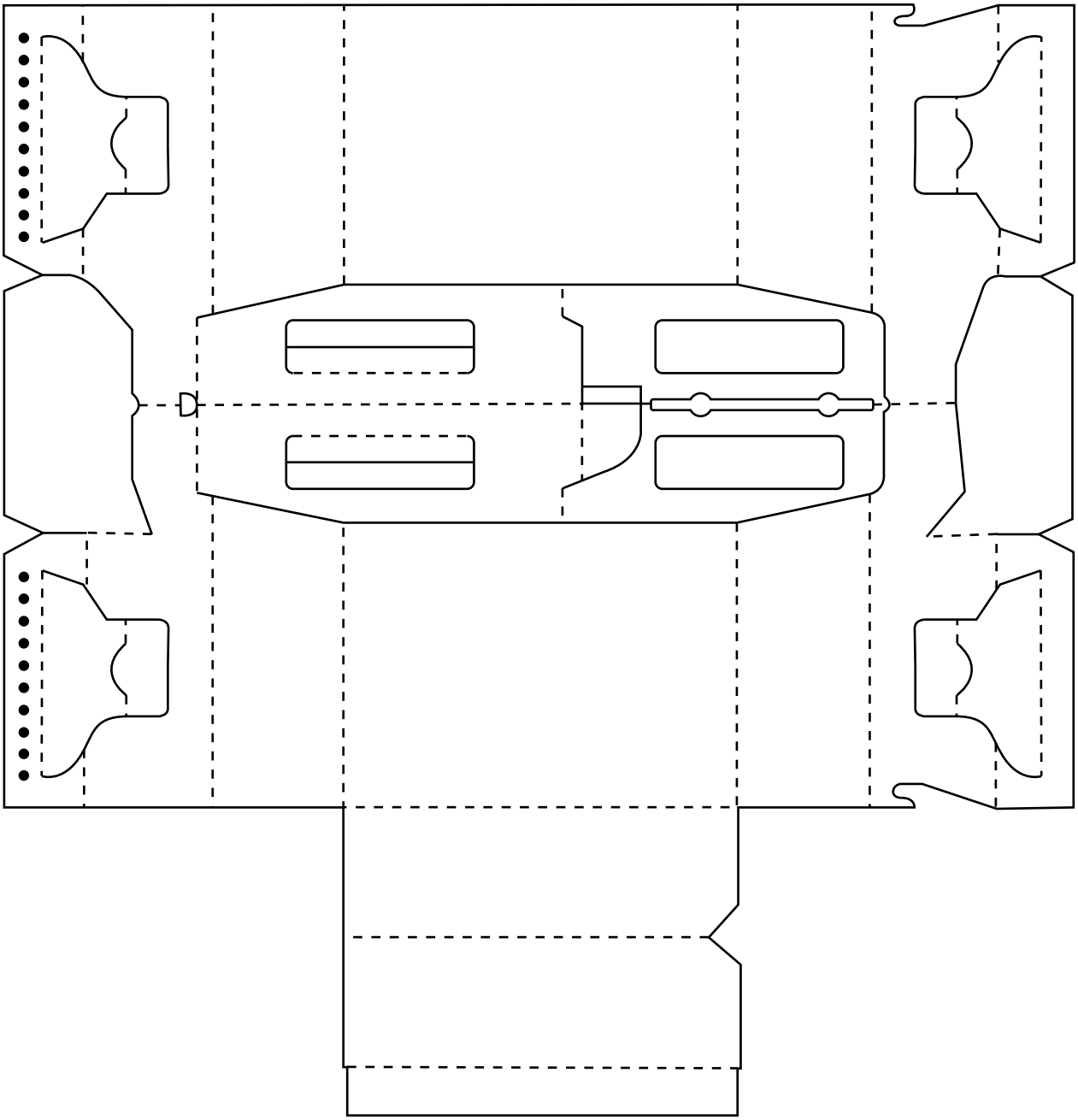


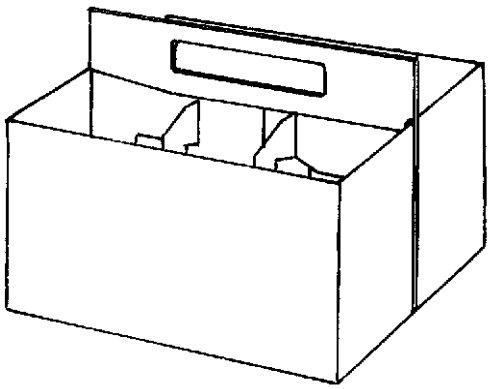
When glued up and assembled, the handle will consist of four layers of board, the center divider of two layers, and the outside and bottom of a single layer.

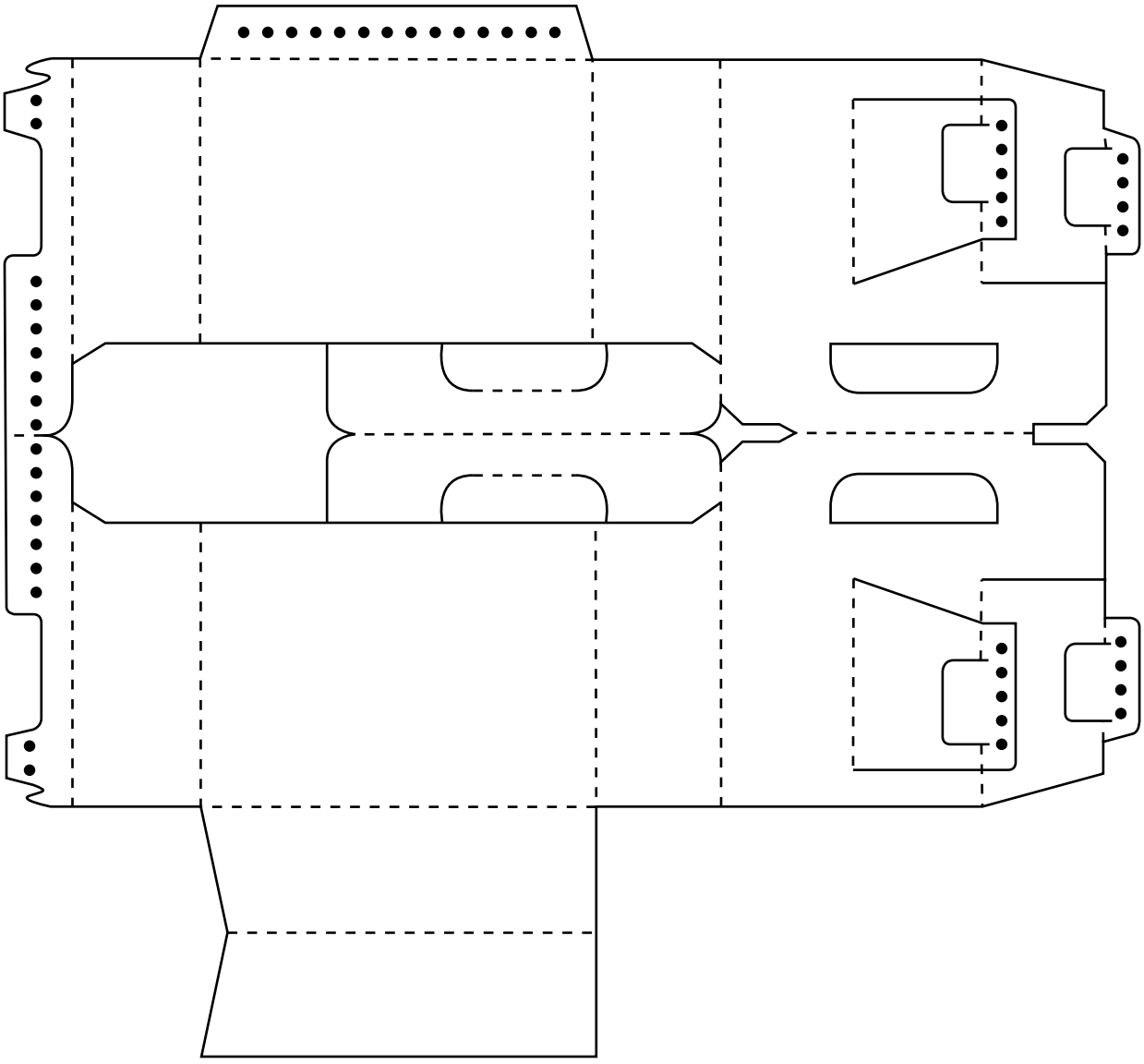


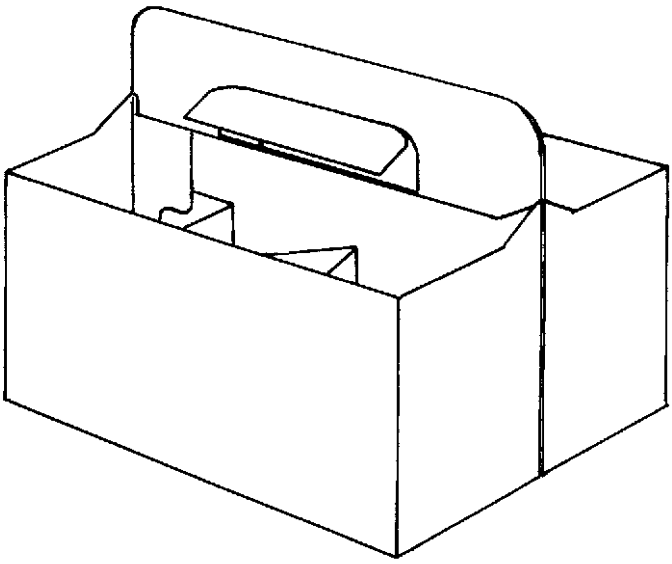


GLUED BOTTOM-STRAP BOTTLE CARRIER

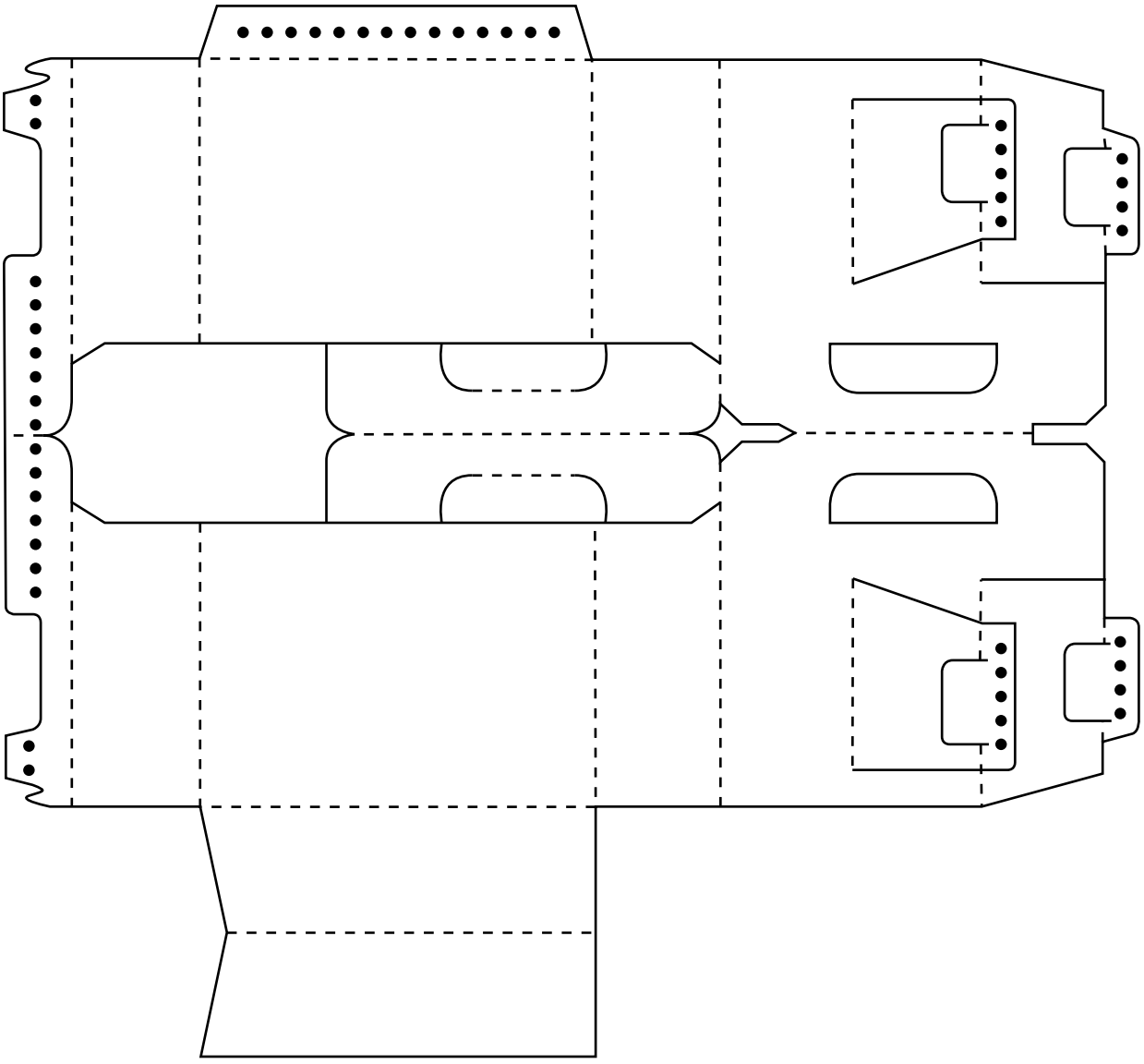


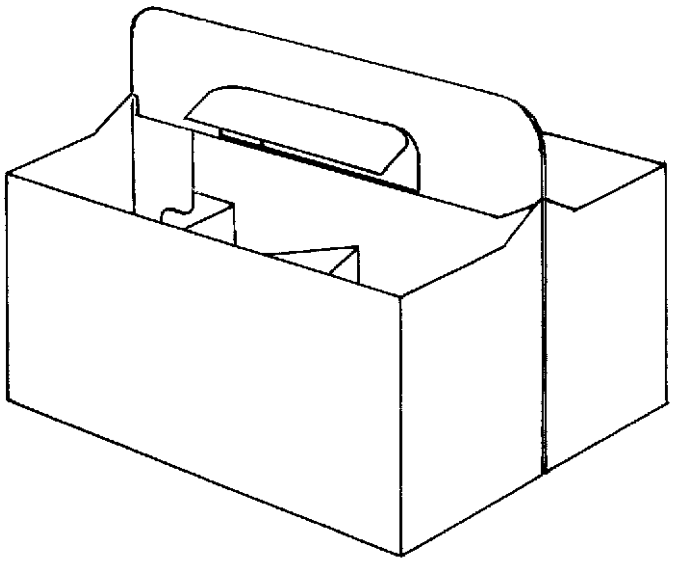


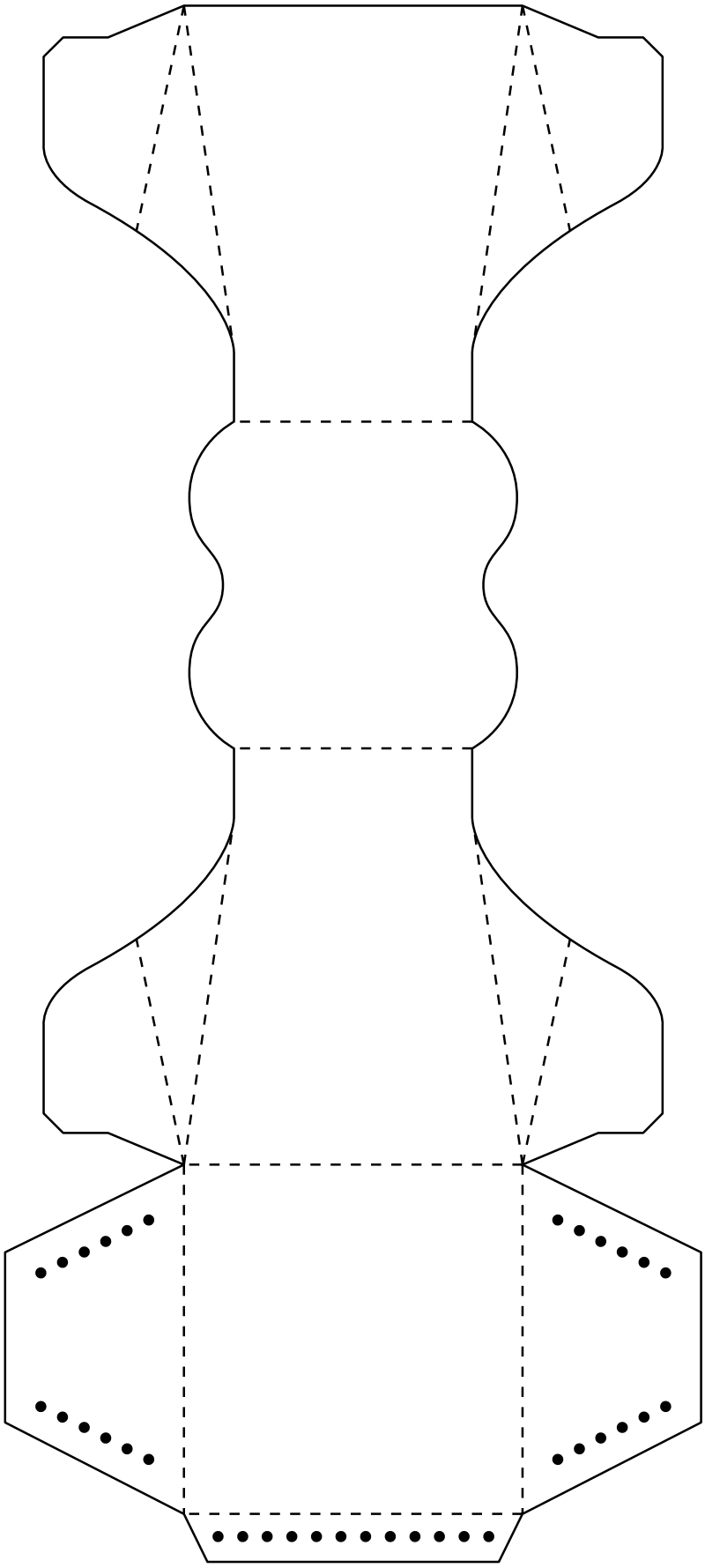


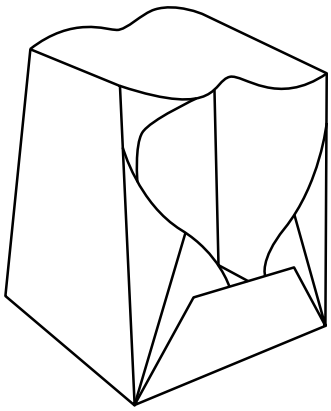


SIX-COUNT BOTTOM-GLUED BOTTLE CARRIER

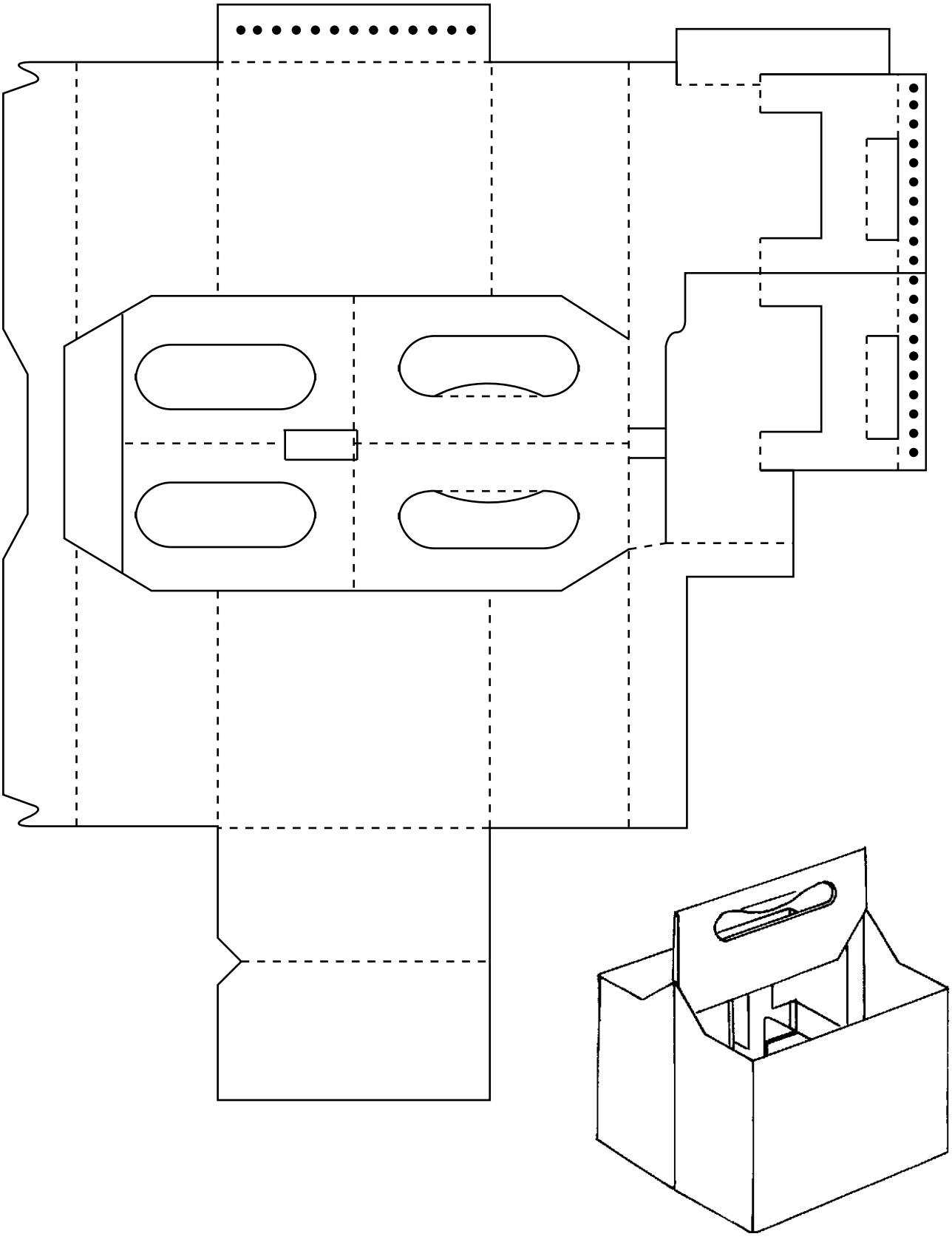


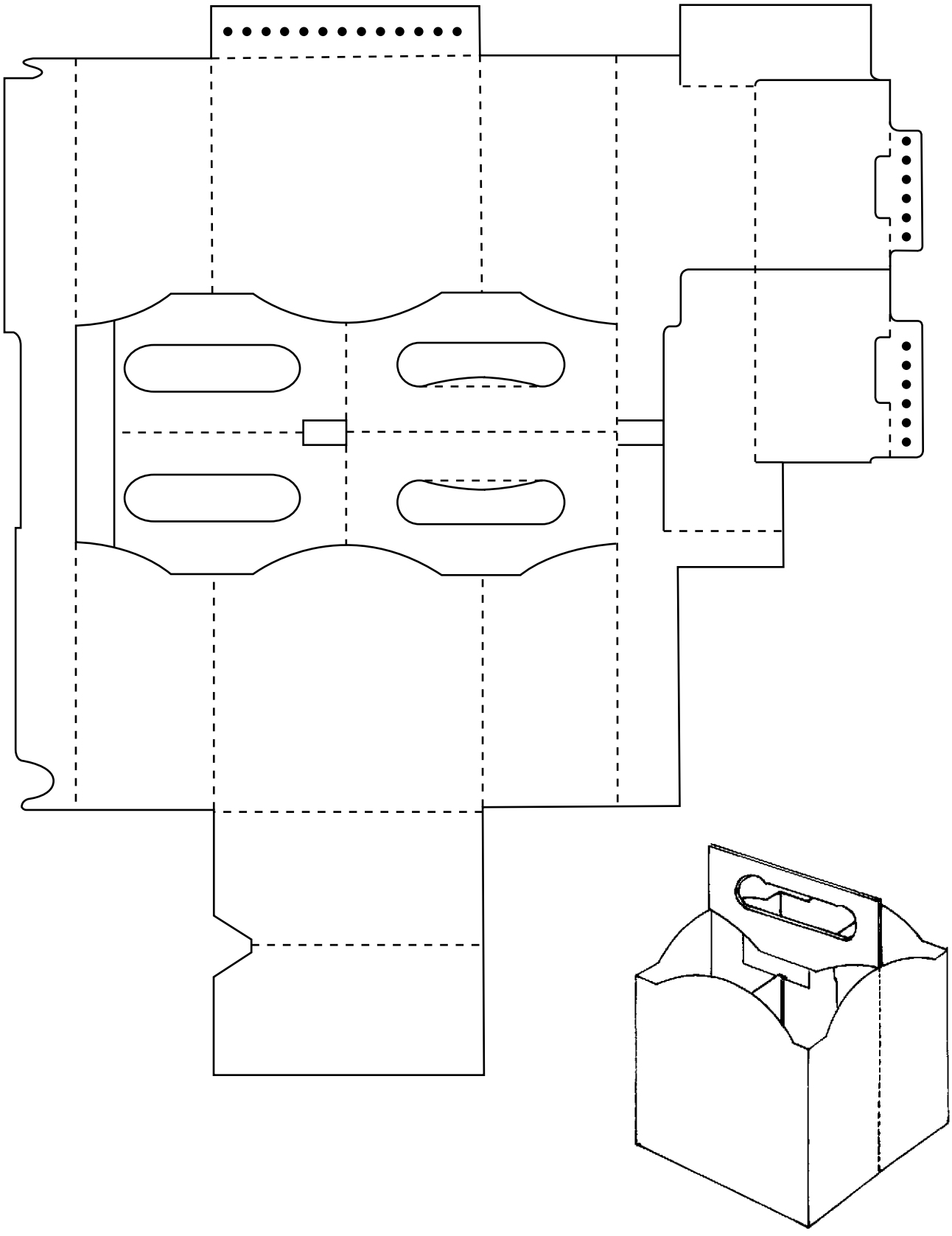




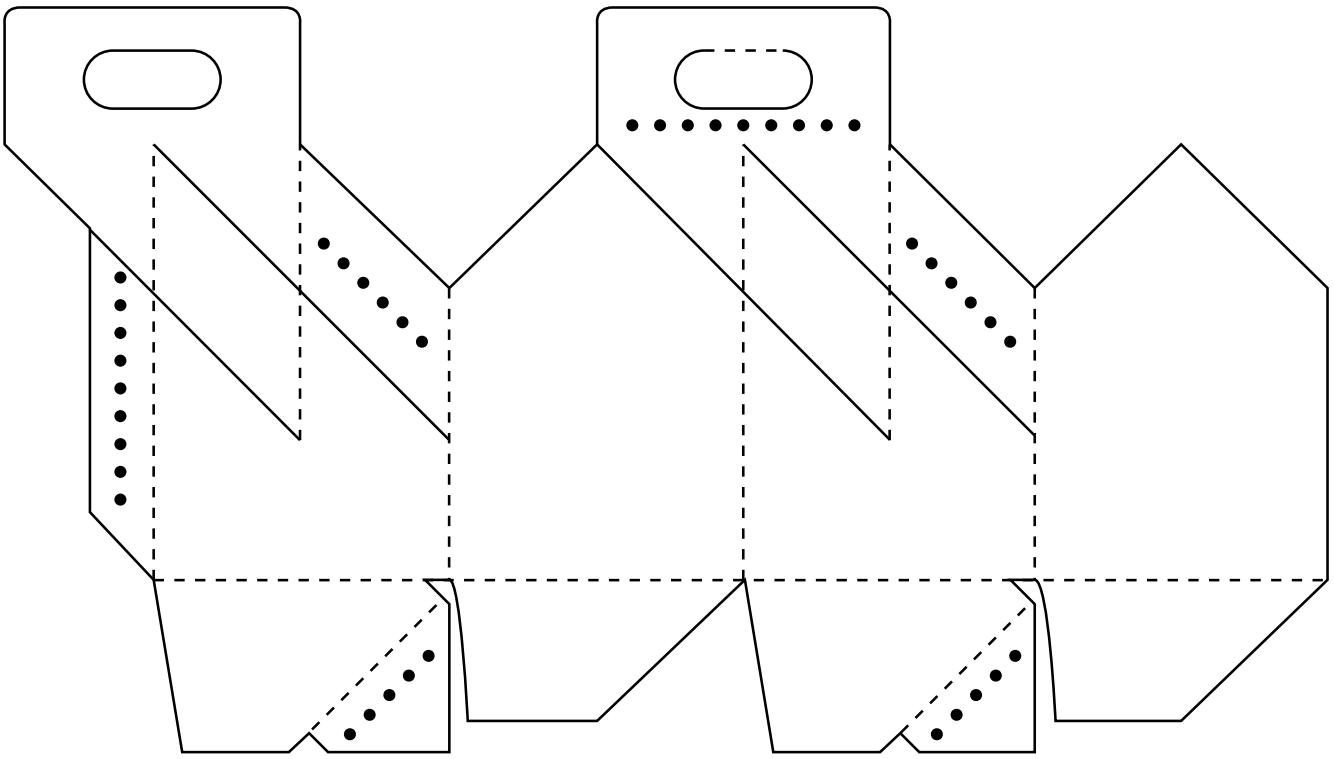


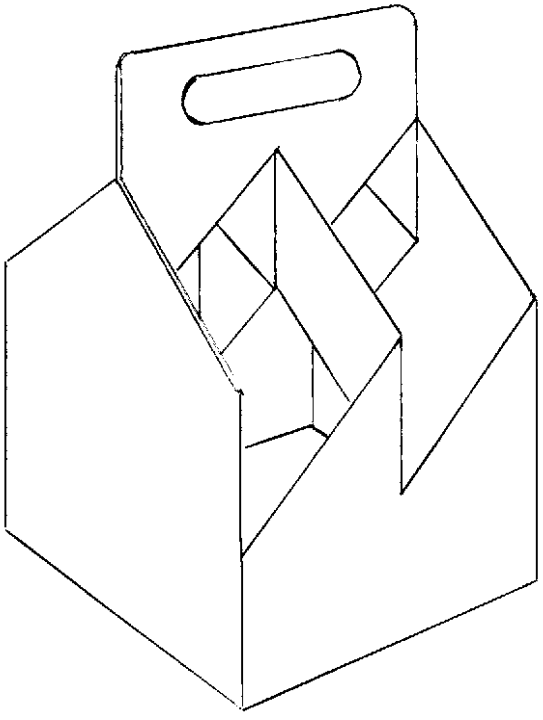
FOUR-COUNT BOTTLE CARRIER

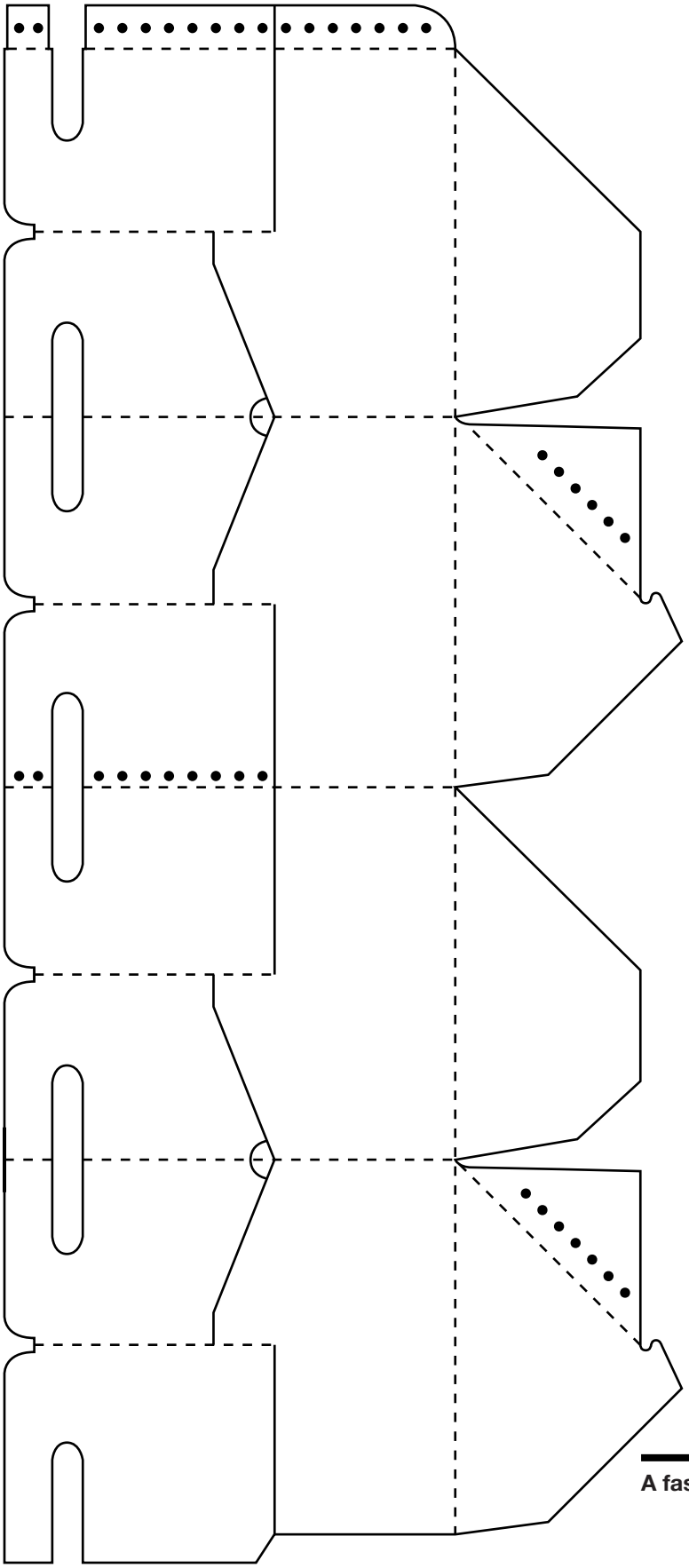


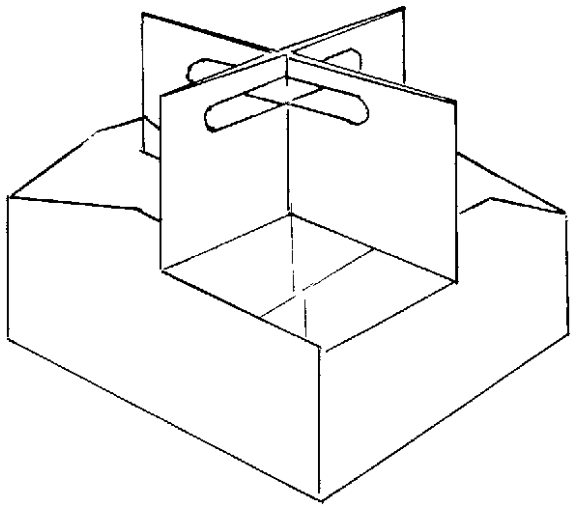


FOUR-PARTITION BOTTLE CARRIER

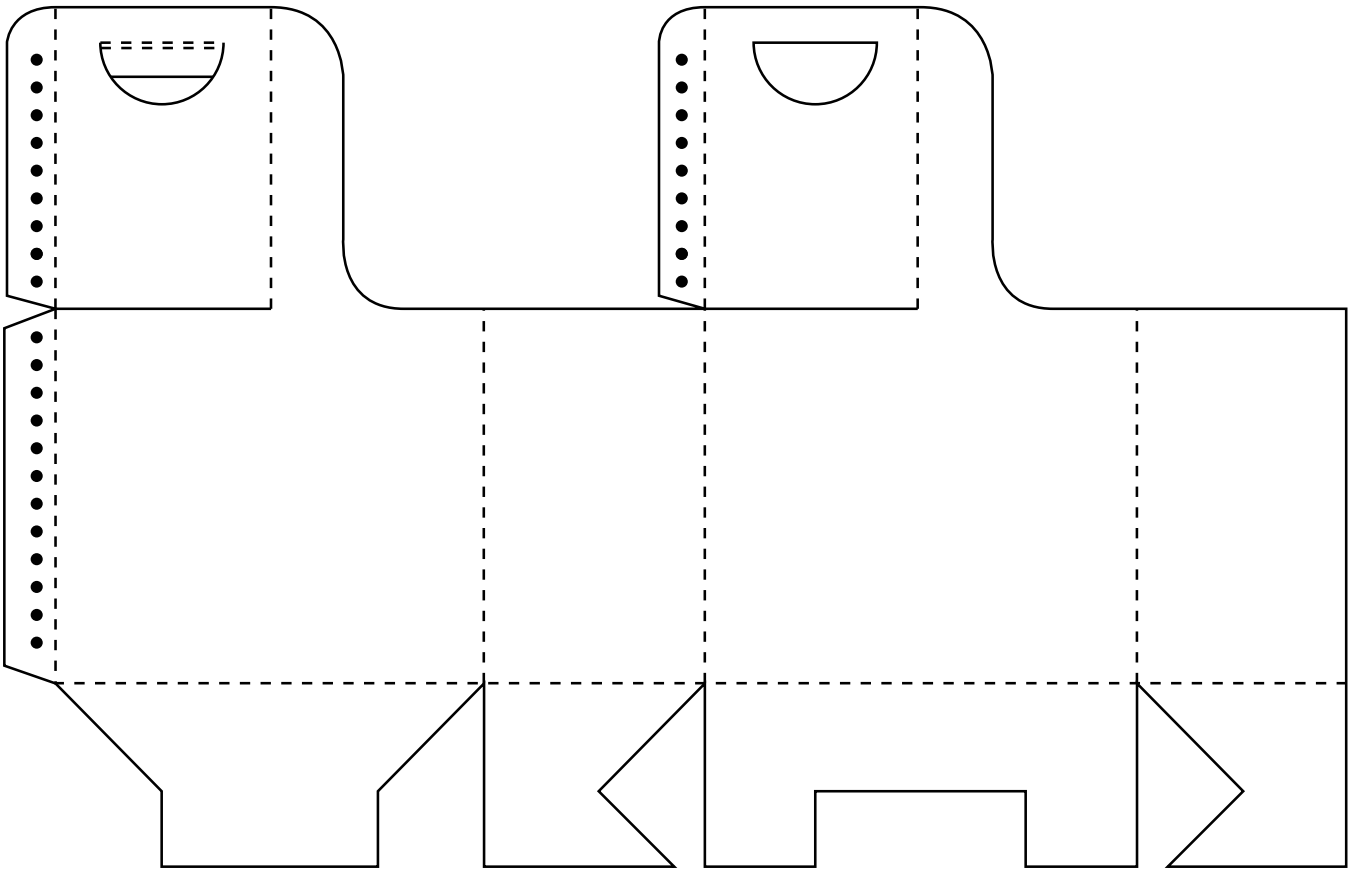




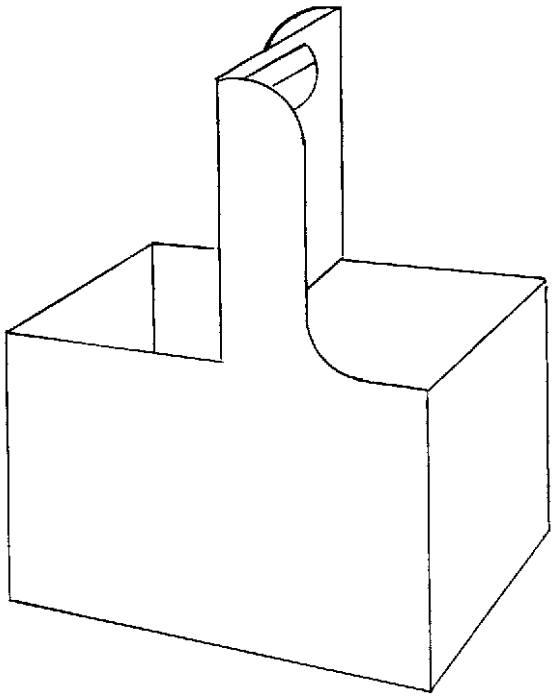




A fast-food carry-out tray with Himes lock bottom.

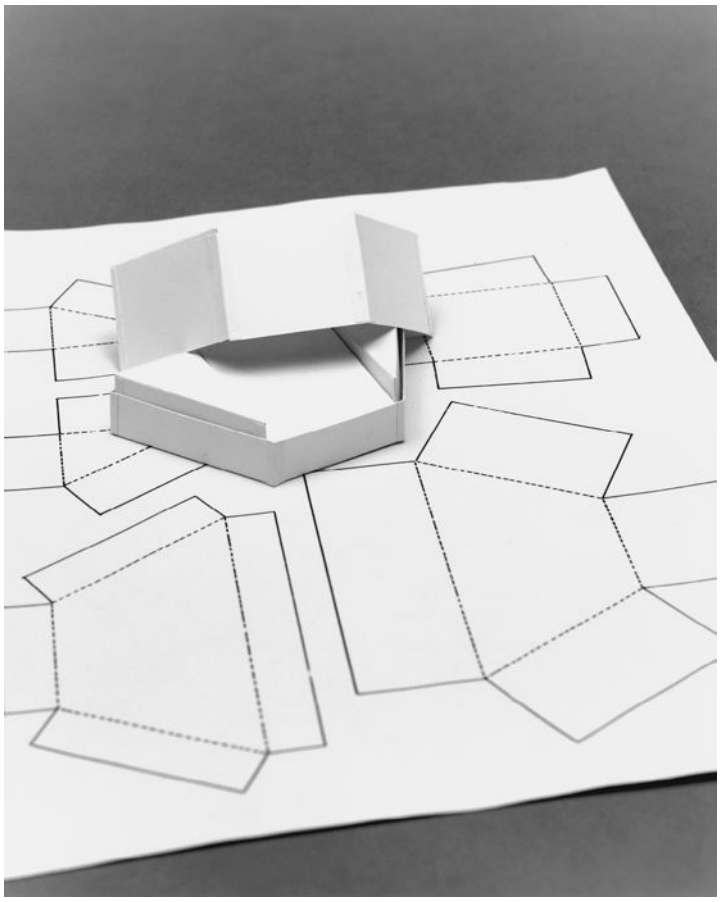


This two-compartment carrier with snap lock or Houghland bottom lends itself to many applications.



3

The Set-Up or Rigid Paper Box



The word *box* is derived from the boxwood baskets made in ancient Rome. By the thirteenth century, the Chinese were making boxes from decorated cardboard made of rice chaff, in which they exported tea. In France, attractive boxes were made for hats, garments, cosmetics, and jewelry in the seventeenth and eighteenth centuries. These boxes were covered with hand-printed decorative papers and fabrics. During the nineteenth century, attractive boxes for toys and games were produced in Germany and England.

The first American boxes using paperboard were made in Boston by Colonel Andrew Dennison in 1844. The name Dennison is still associated with many kinds of paper products.

Store clerks often used crude wooden jigs to form cardboard into "cartons," which were closed and tied with string. From this simple device the set-up box evolved. According to historians, it is possible that an artistic salesperson hand lettered the store's name on the box. This event could be considered the birth of the brand name.

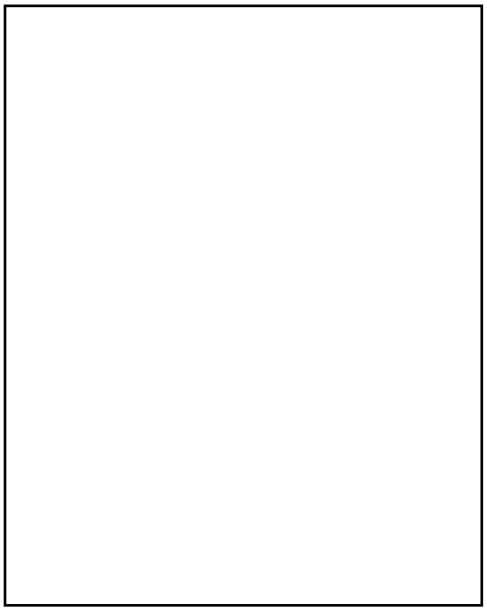
The set-up paper box is produced and delivered as a three-dimensional construction ready to be packed with merchandise. It is manufactured in a series of simple steps that do not require costly dies or machinery. Production runs can be small, medium, or large.

The basic set-up box can be modified to accommodate unusual requirements; transparent plastic domes and platforms, a variety of hinges, embossing, gold stamping, lids, and compartments can be added. The versatility of the set-up box is valuable because it adds to the display and gift appeal of boxed items. It is no accident that set-up boxes are so widely used in the merchandising of cosmetics, jewelry, candy, and gifts. The box not only provides protection but has great promotional value.

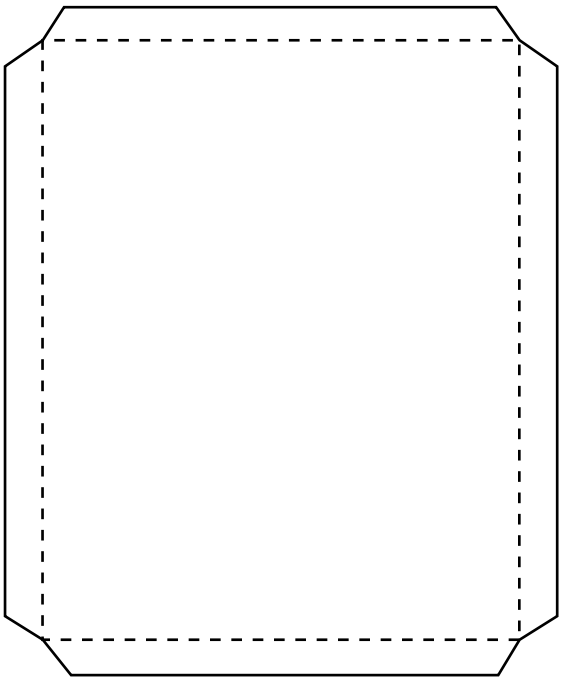
Set-up boxes are made from four basic materials: boxboard, corner stays, adhesives, and covering materials. The process is as follows:

1. Flat sheets of boxboard are cut and scored to size. Individual blanks are separated from the sheet and the corners are cut out.
2. The sides of the blank are folded at right angles to the base to form the sides of the tray.
3. The corners of the tray are sealed by adhering paper, fabric, or metal to reinforce the corners.
4. The decorative covering is adhered to the box.

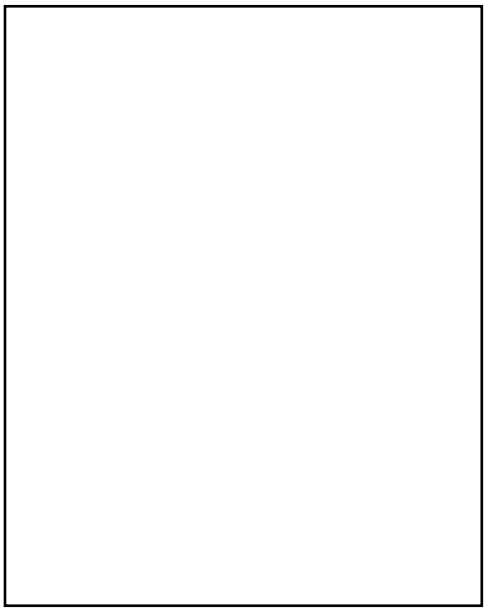
Variations in the basic shape and dimensions of boxes can be made in order to produce an infinite range of designs. Possible shapes include cubes, pyramids, cones, hearts, and stars. Boxes with hinged lids, telescoping boxes, boxes with compartments, boxes with slide-in drawers, and boxes with plastic thermoformed platforms can also be designed. Coverings or wraps may be selected from a wide range of papers or fabrics, which provide both protection and decorative effect.



Board

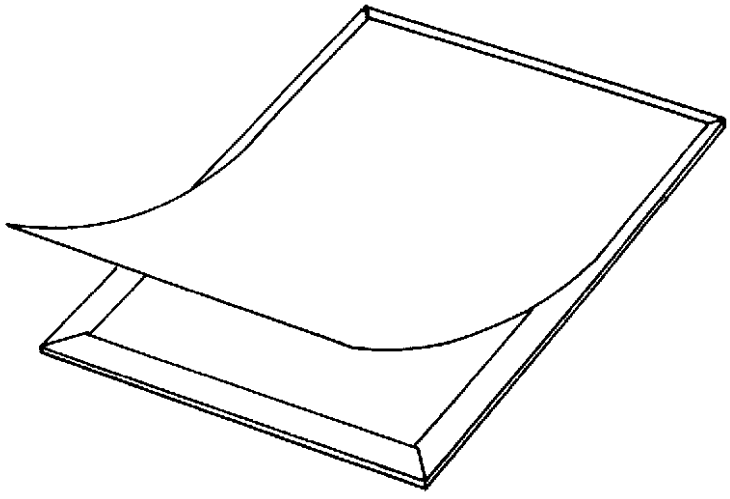


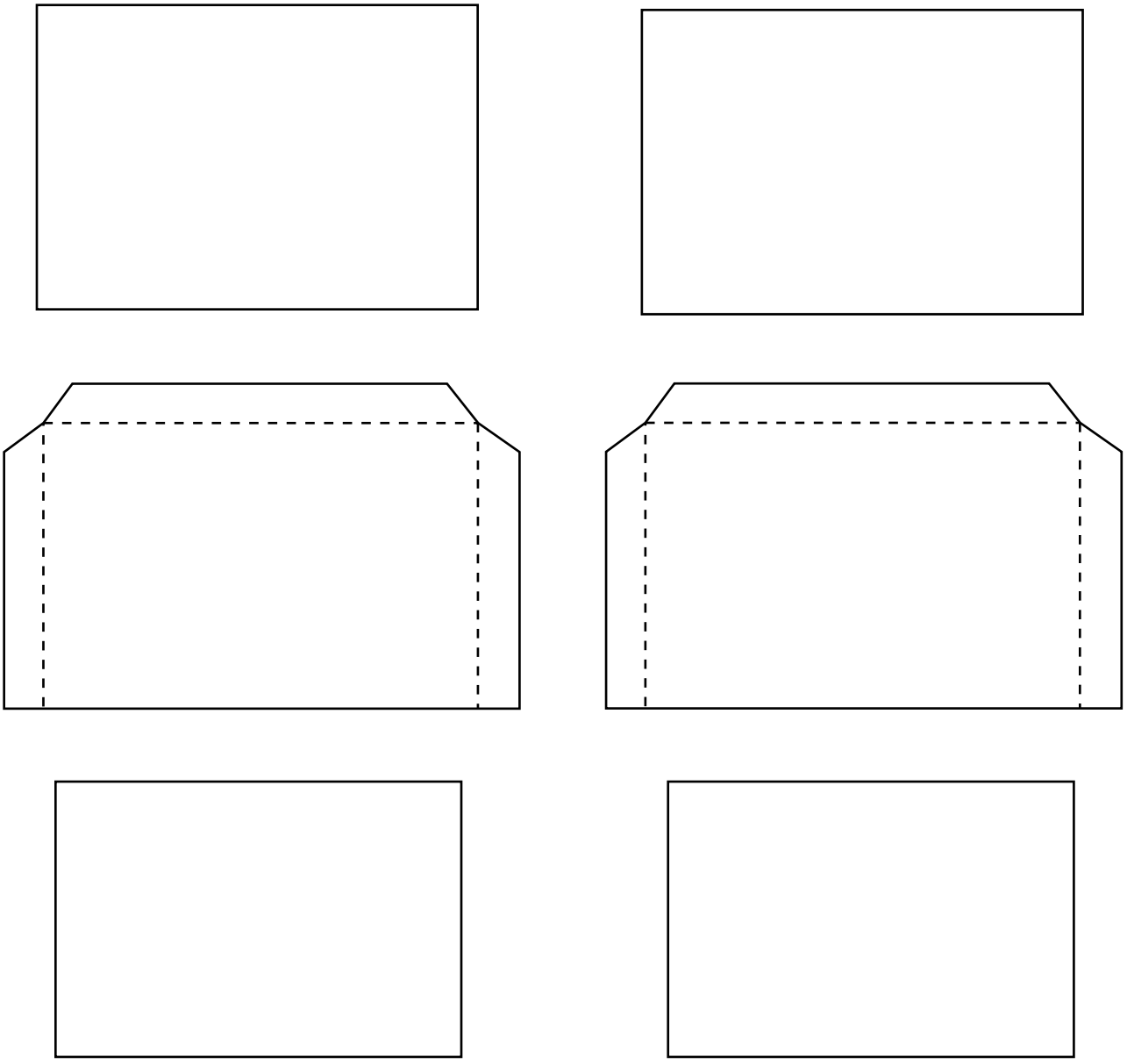
Cover stock



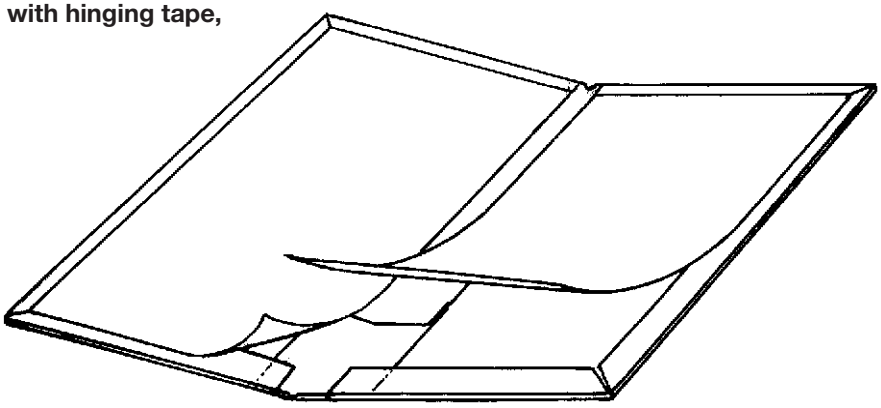
Inside cover stock

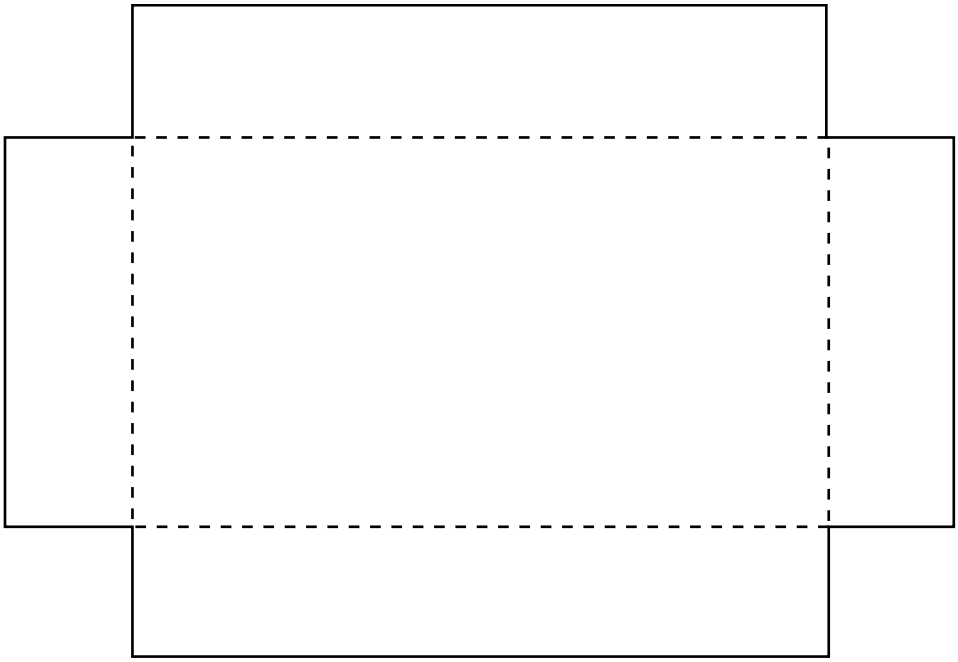
A single board is covered with cover stock on the outside, with edges overlapping the inside. The inside is covered with cover stock slightly smaller than the overall dimension.



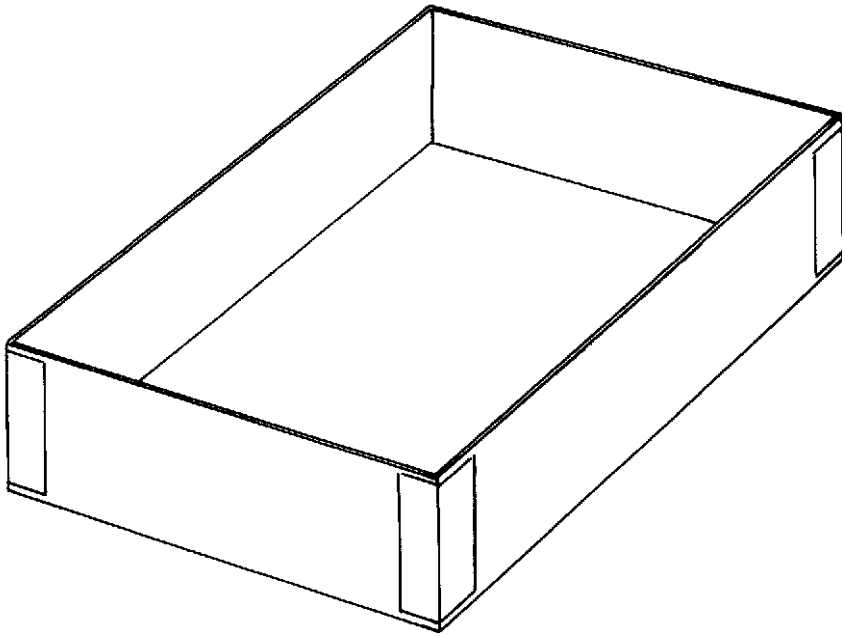


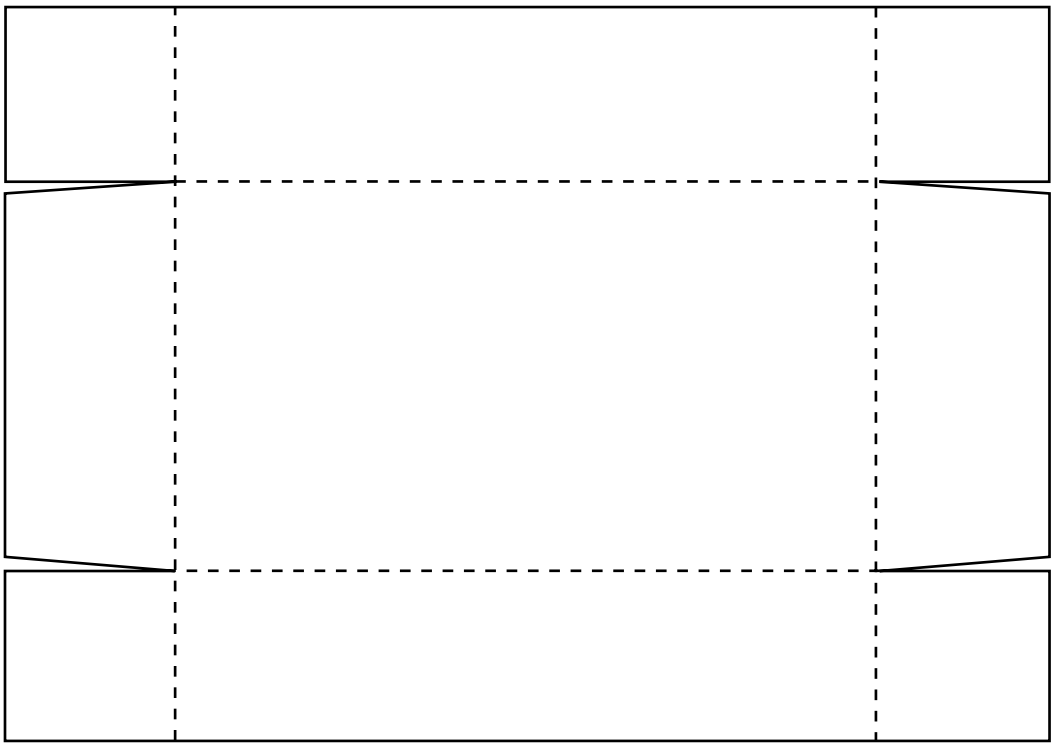
Two pieces of board are attached with hinging tape, then covered with cover stock.

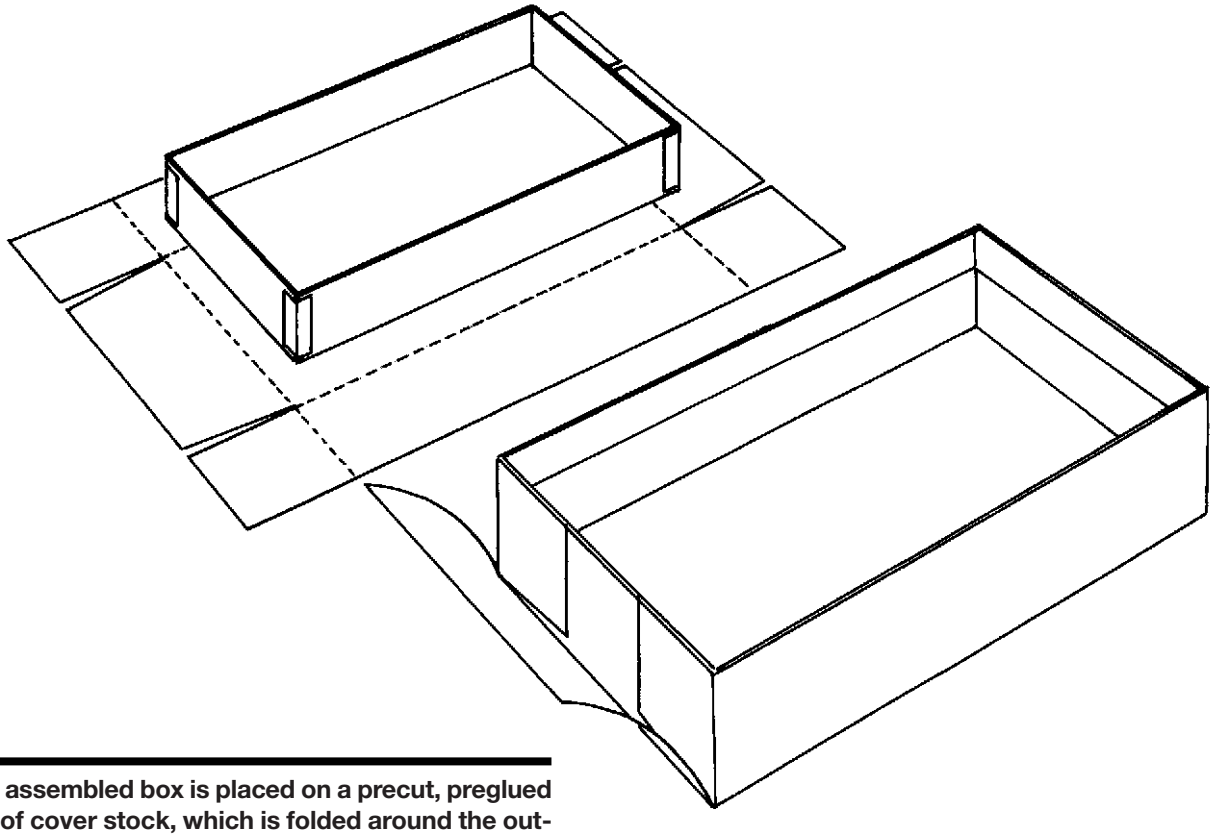




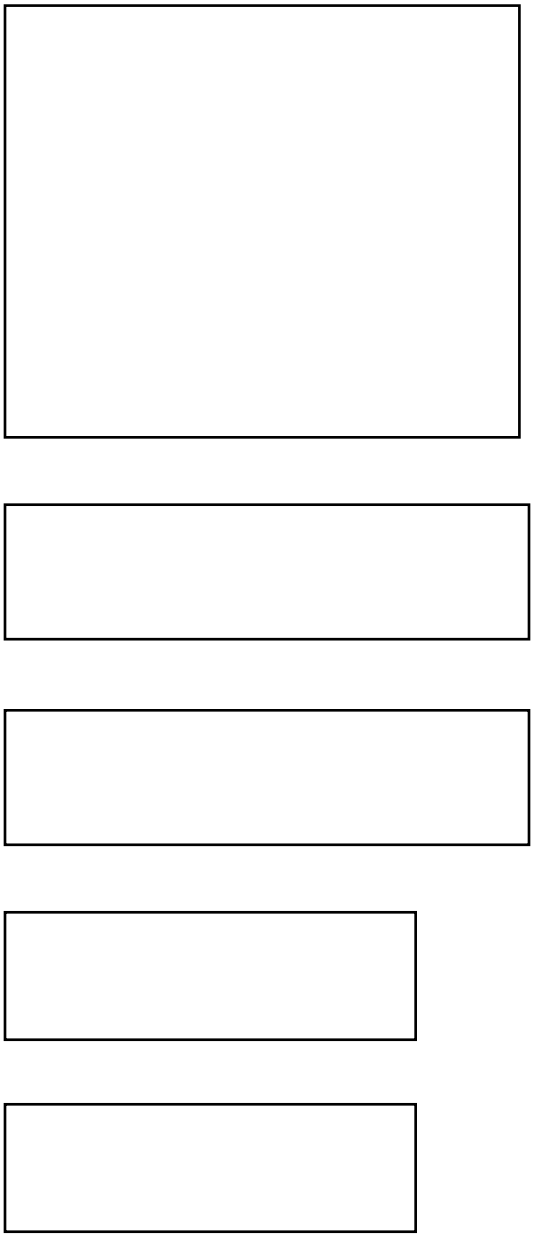
1. The stock is scored with cutting dies that cut approximately halfway through the board. The corners are then cut away so that only the bottom and side panels remain. The side panels are bent up and fastened at the corners with stay tape.



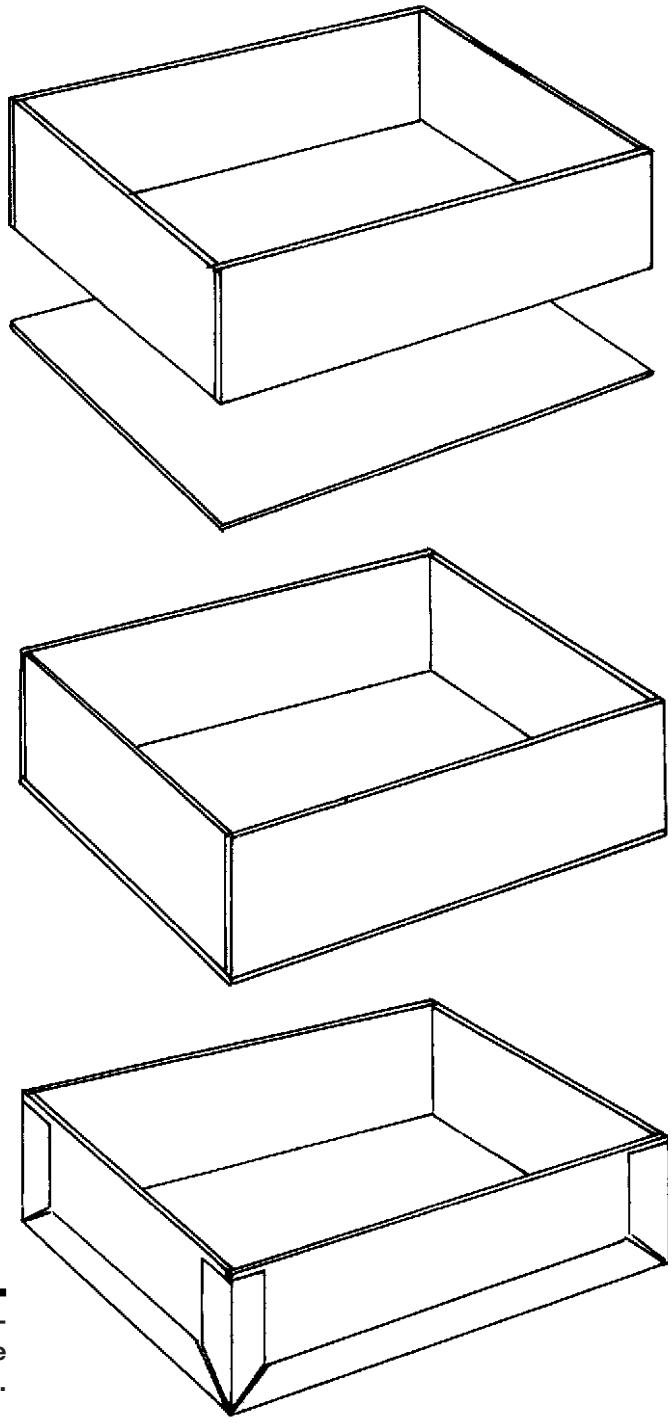




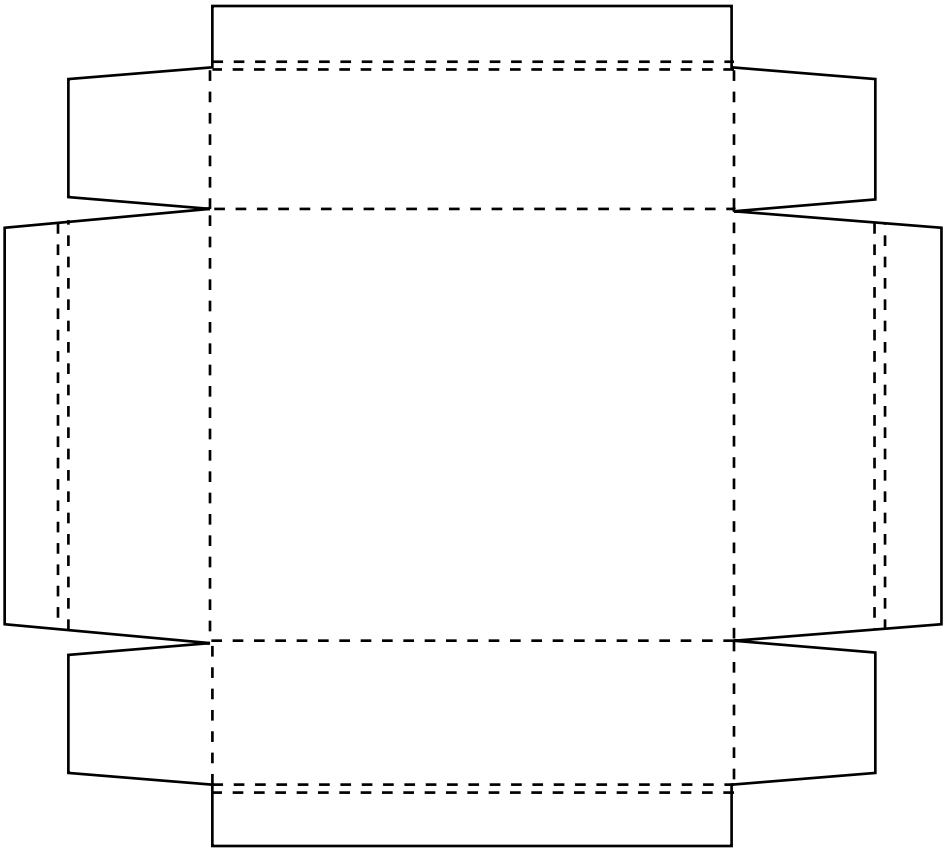
2. The assembled box is placed on a precut, preglued sheet of cover stock, which is folded around the outside and partially into the inside of the box.



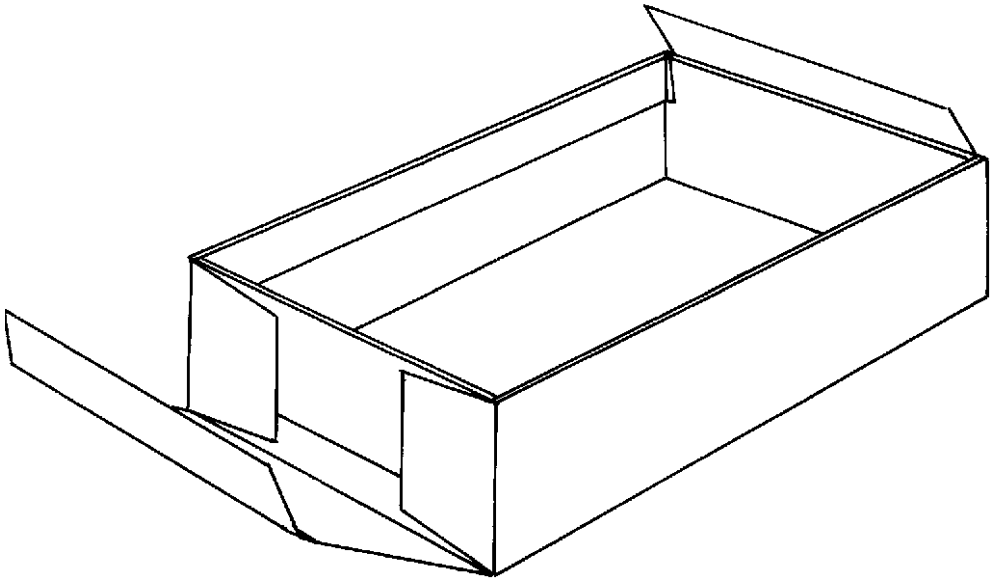
1. Since it is somewhat difficult to score the board from which you are preparing the set-up-box model, we often use single-weight illustration board and cut each piece separately. Consider the thickness of the board in the dimensions.

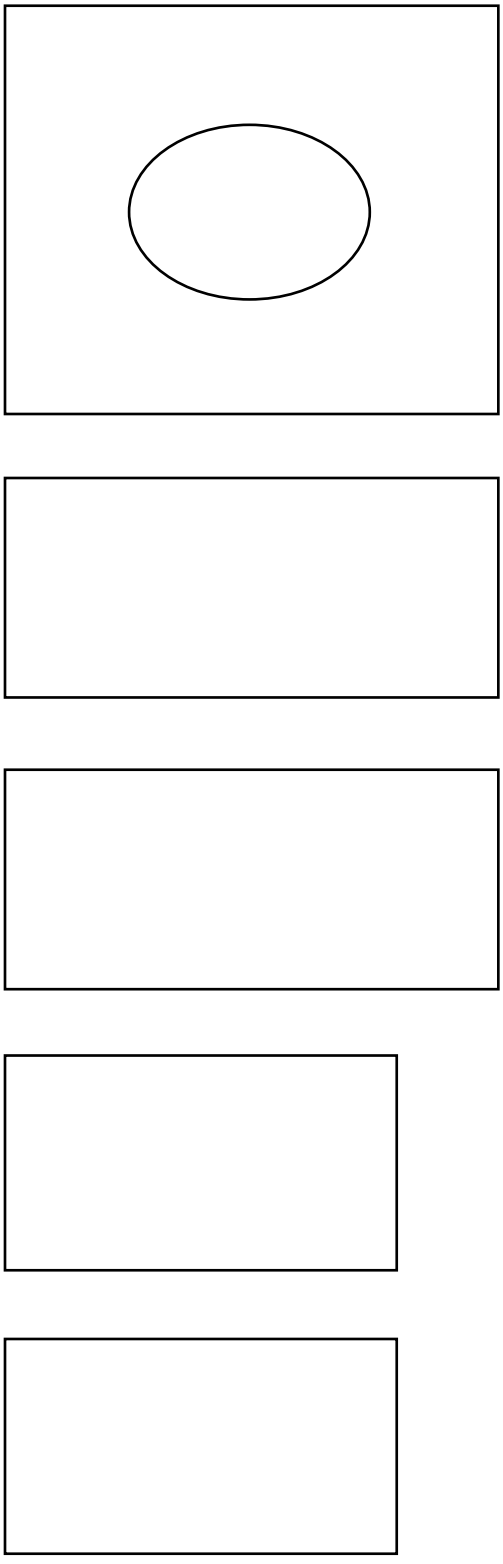


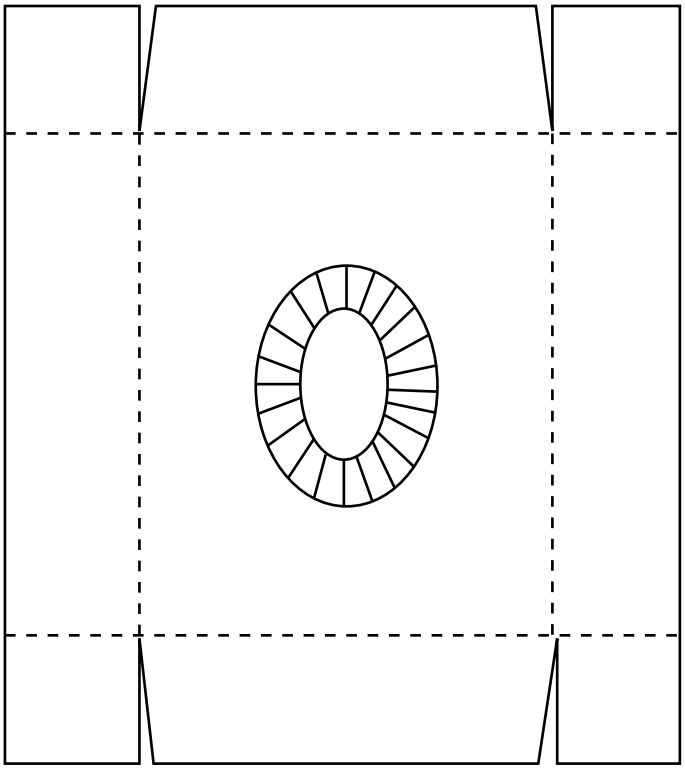
2. The pieces here have been cut out of 1/16"-thick illustration board. The side walls are glued on the base with white glue; then the end pieces are fitted in. White masking tape is used in lieu of stay tape.

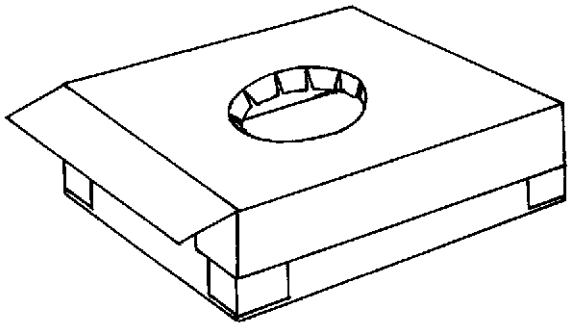


3. The assembly is covered with a nice cover stock. For this you may use rubber cement or, preferably, bookbinder's glue.

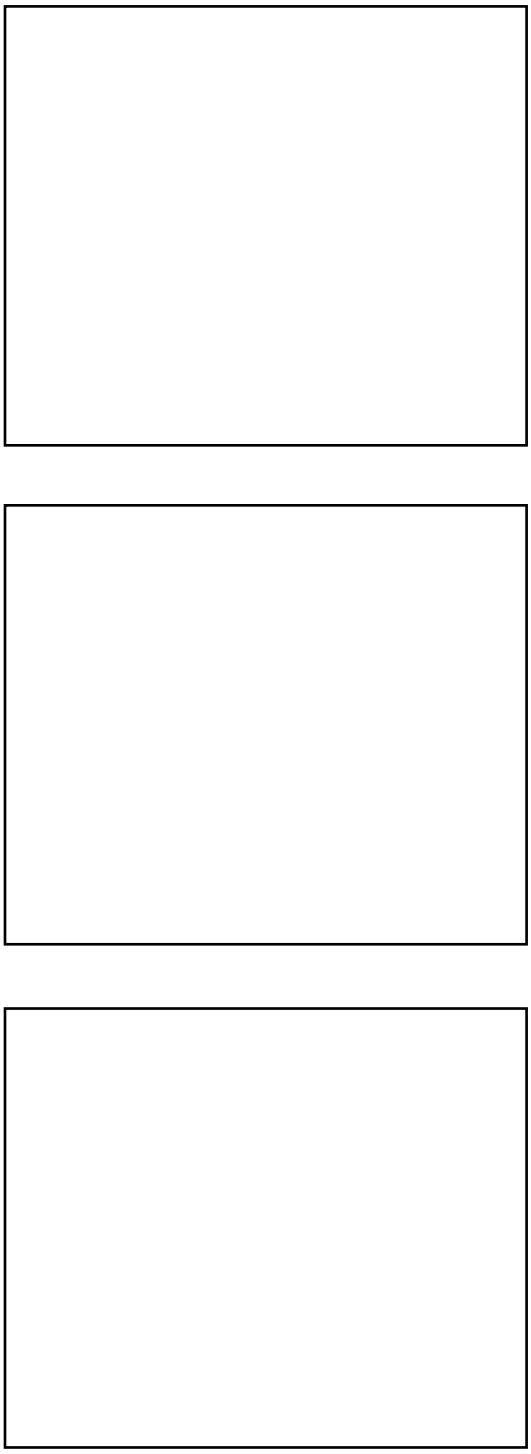




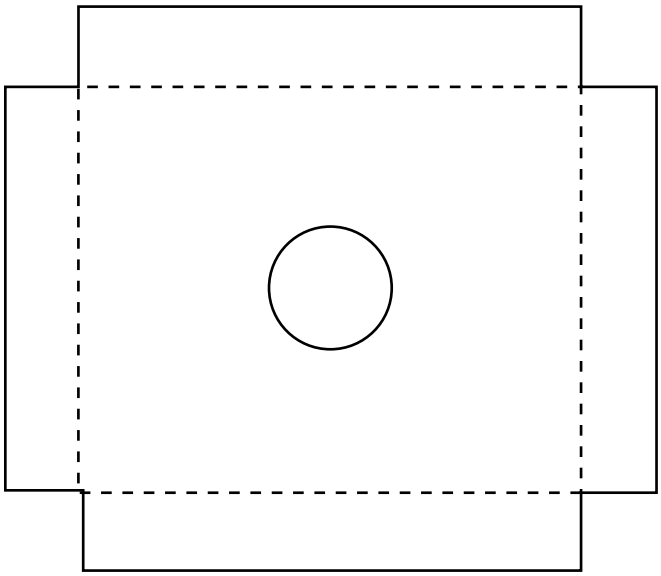




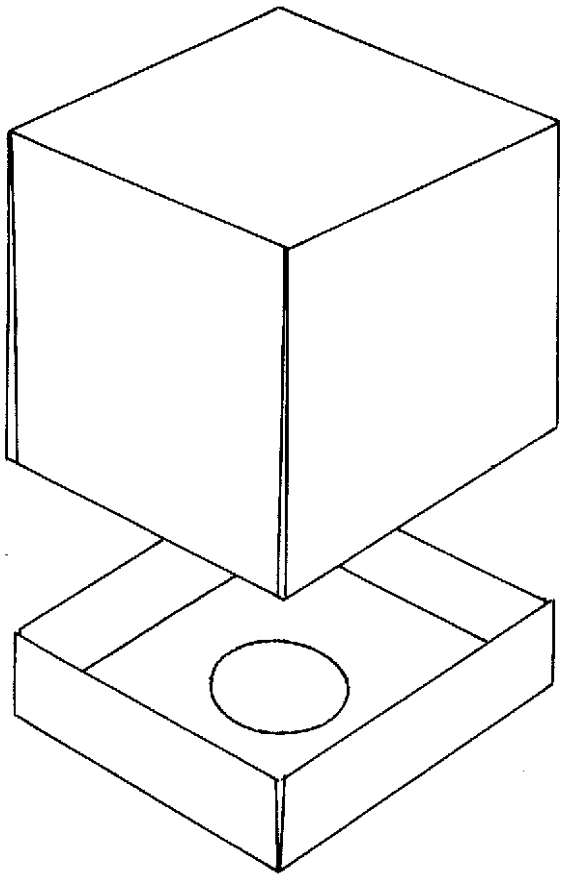
4. Next we build a platform with an oval cutout. This platform is measured to fit snugly into the tray we have just completed. When measuring, consider also the thickness of the cover stock and adjust the size of the platform accordingly.



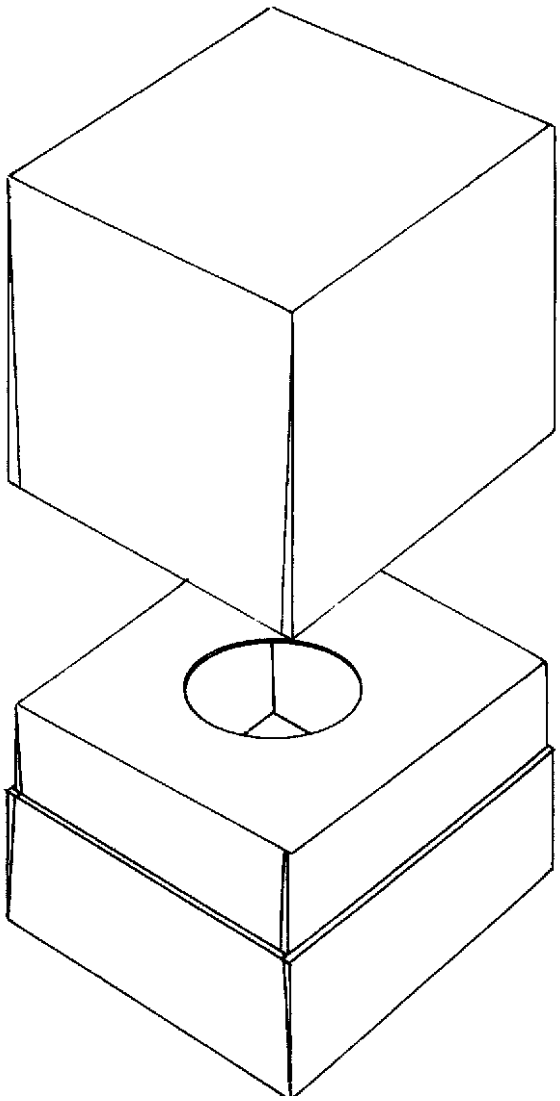
5. Here we have the top and four sides of the lid, which should have the same width and depth as the base, since it will fit over the platform.



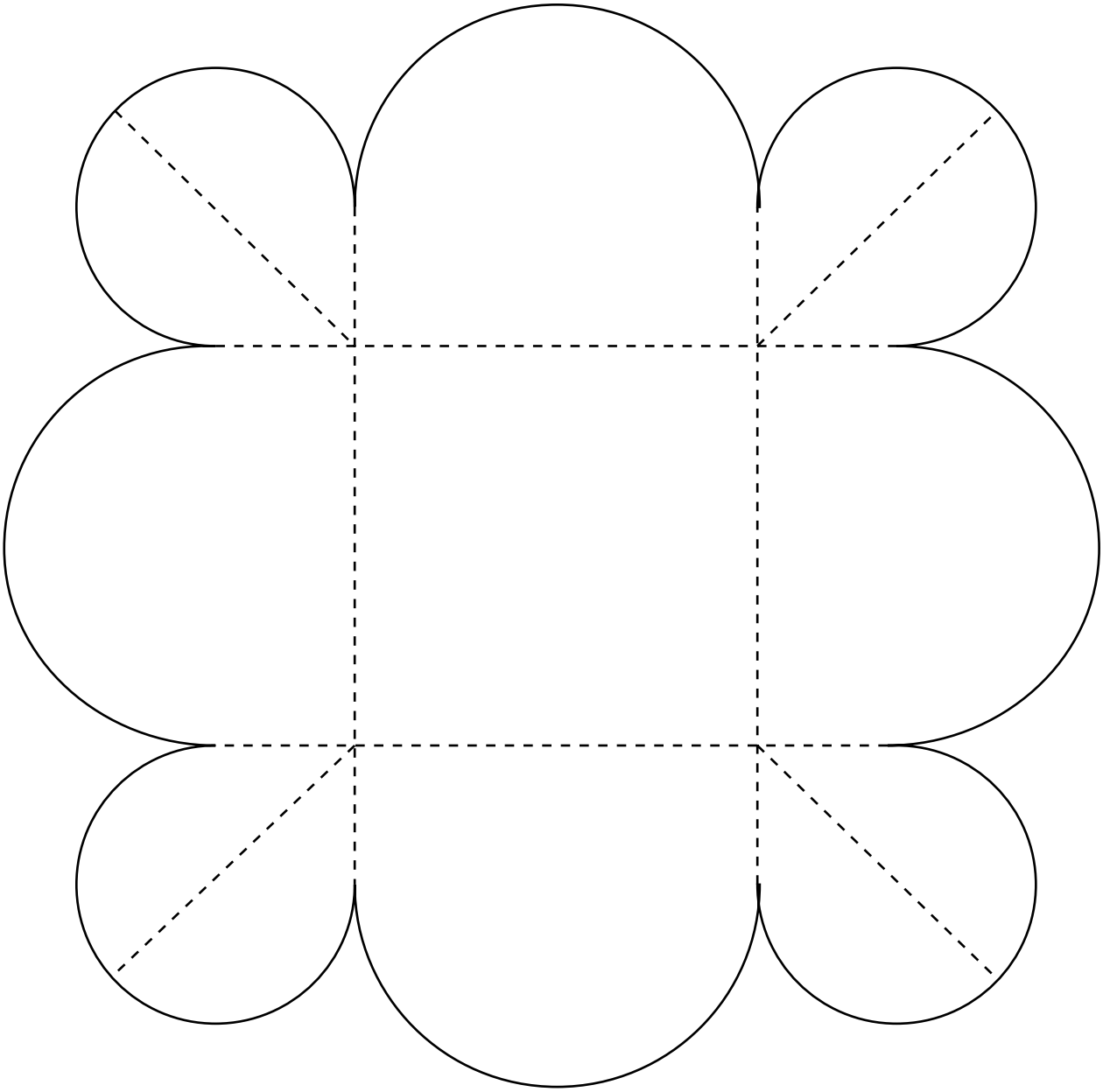
6. This insert is for the lid and need not be covered with cover stock.



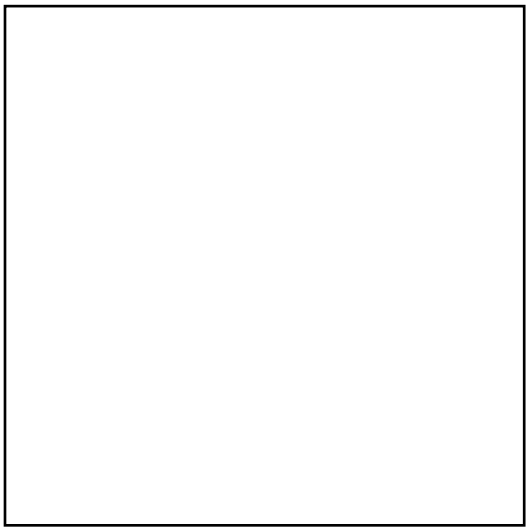
7. Glue the insert into the lid; the circle was cut to fit the cap of the bottle to be packaged.

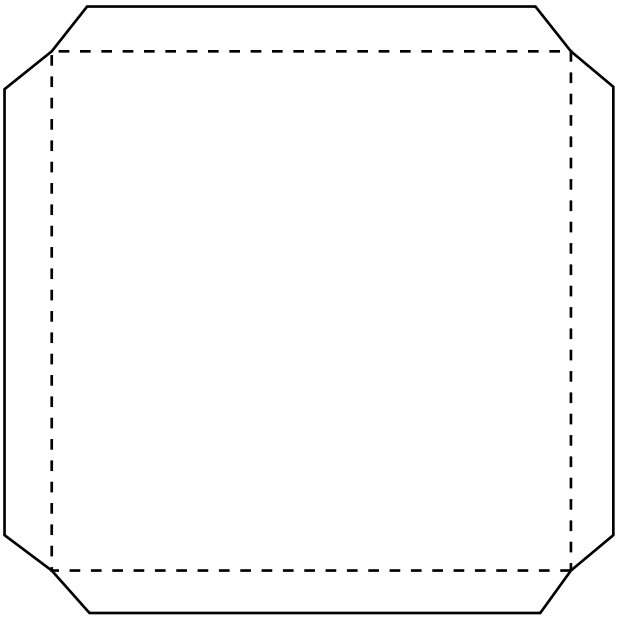


8. The platform may be glued into the base; the result is a handsome rigid or set-up box. If you wish a small part of the platform to show, you need only place an additional liner inside the cover. This will prevent the cover from sliding all the way down to the base.

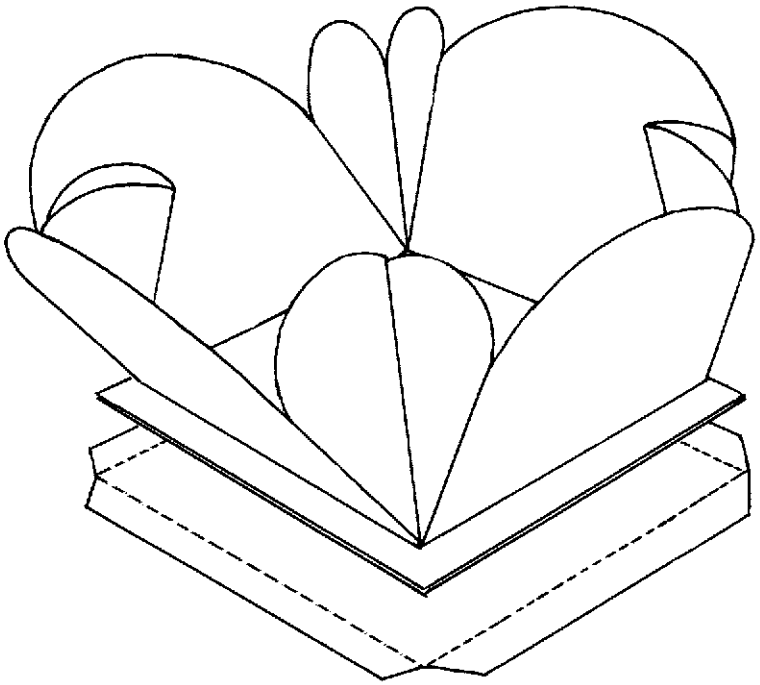


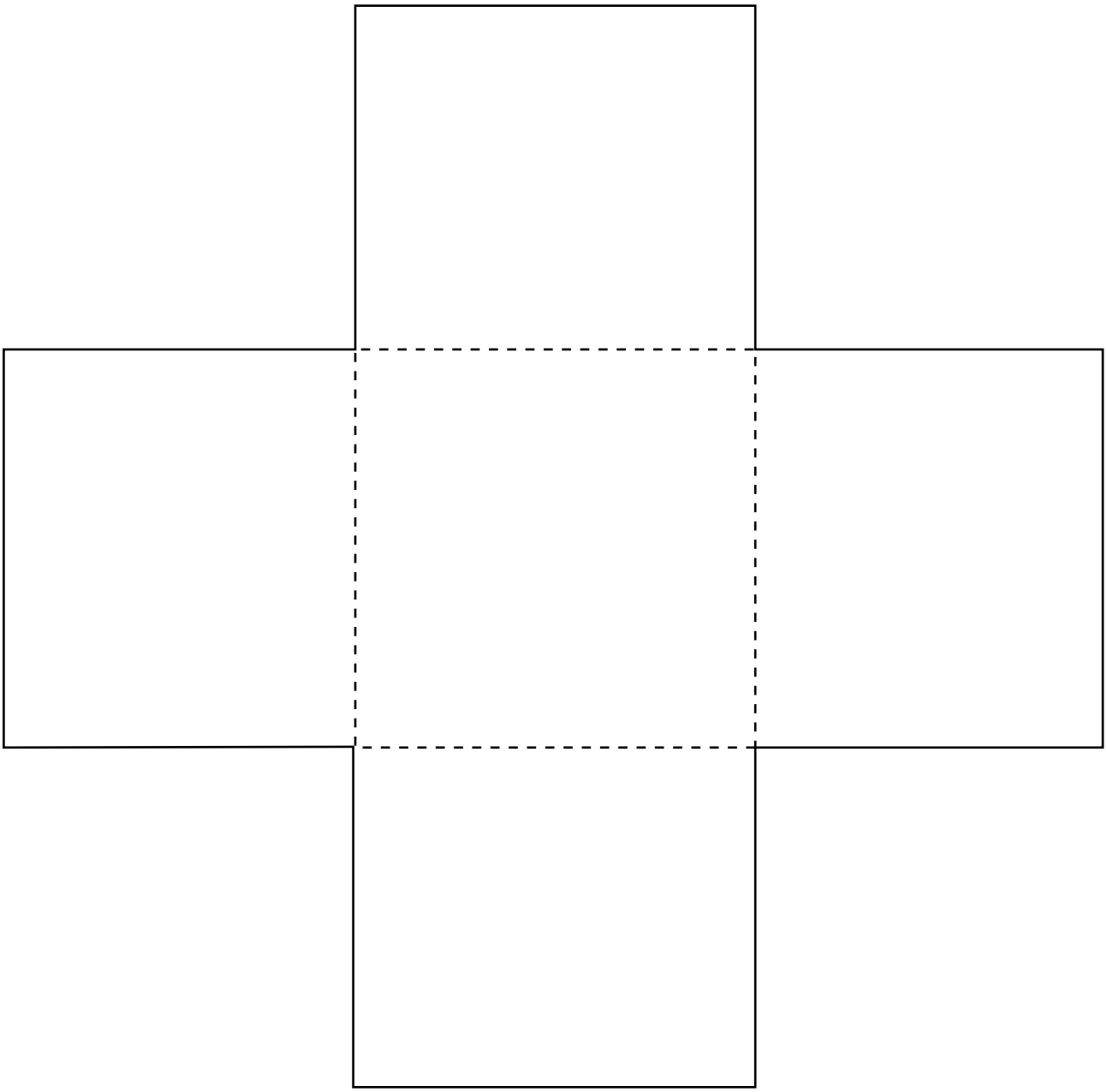
This is a folded piece of boxboard to be used as an insert for the following rigid box.

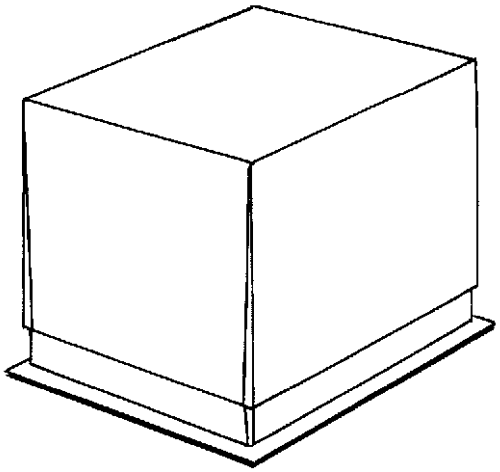




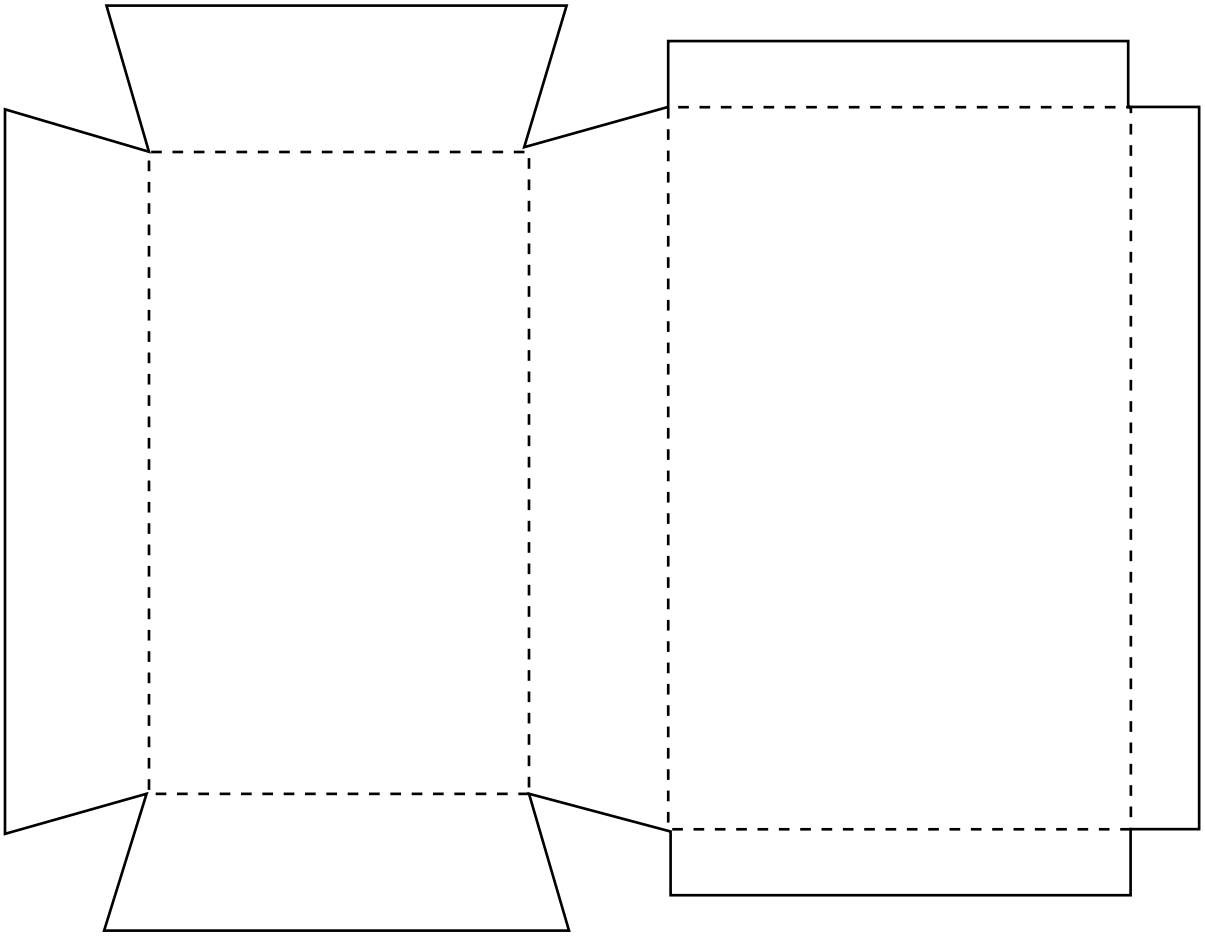
Here the folding insert is glued into the lined base.

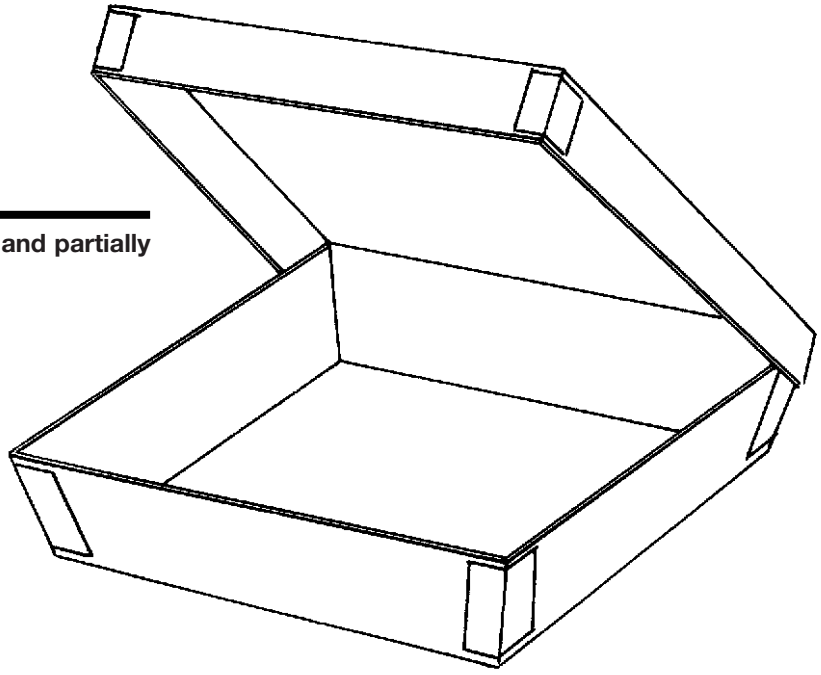




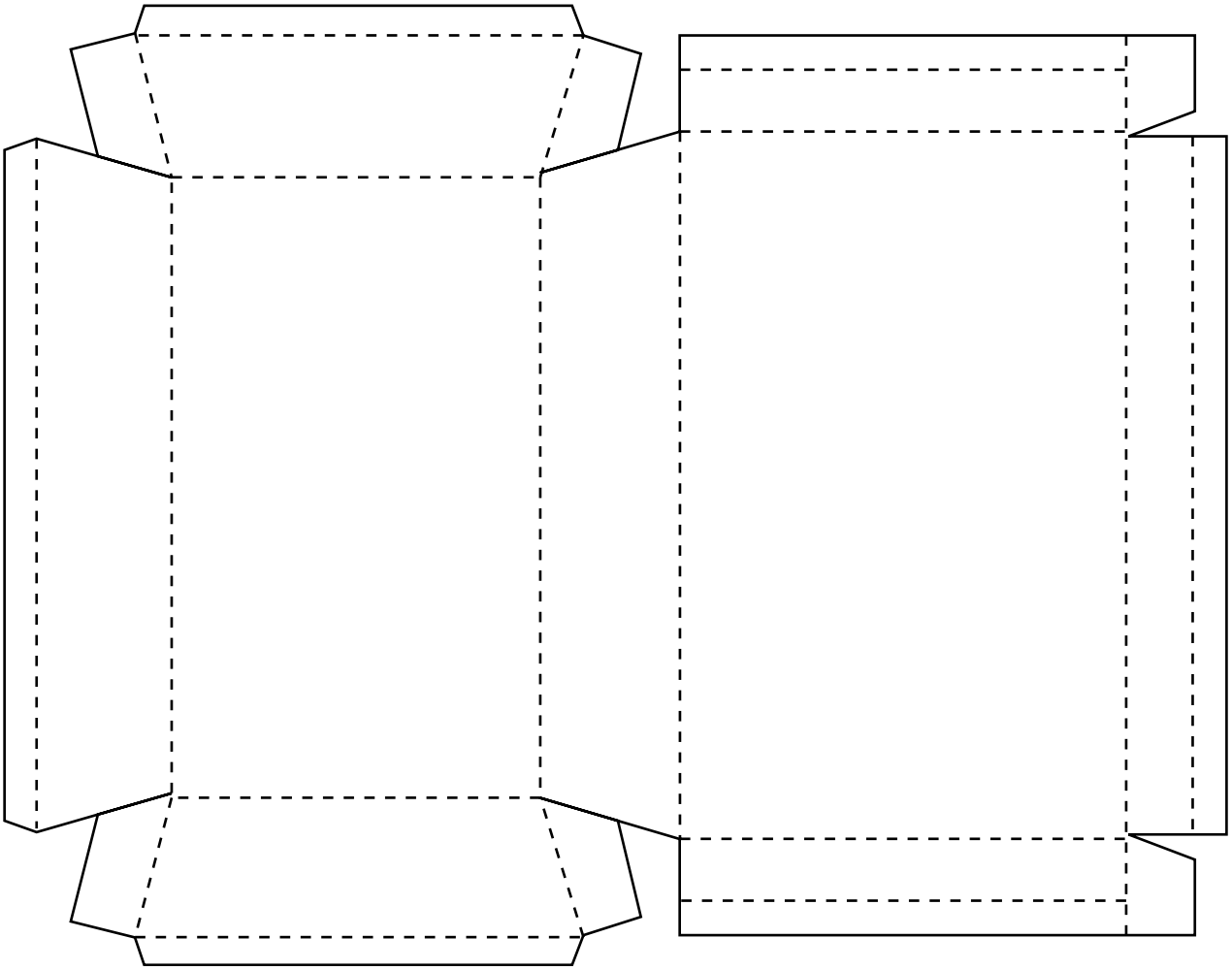


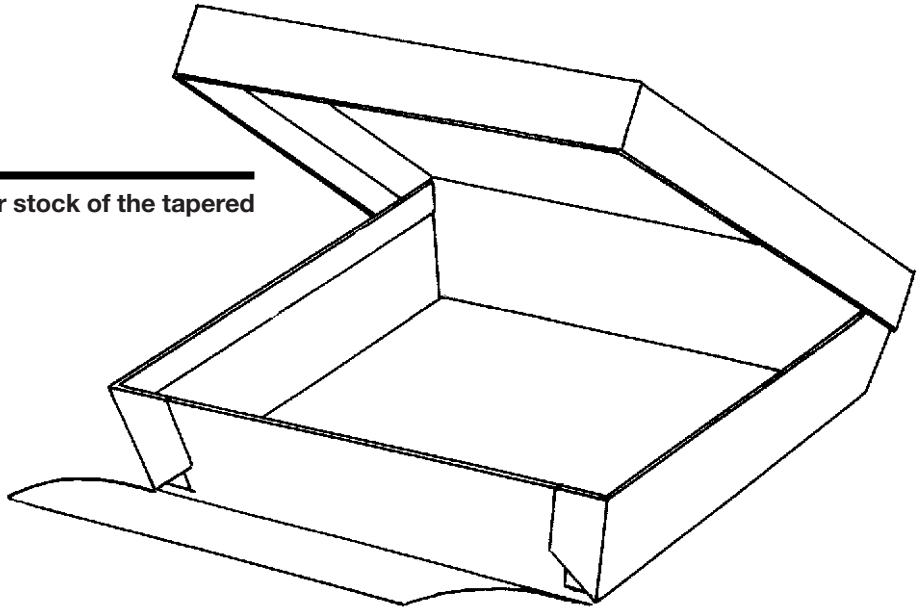
This is the cover for the box in the preceding two drawings.



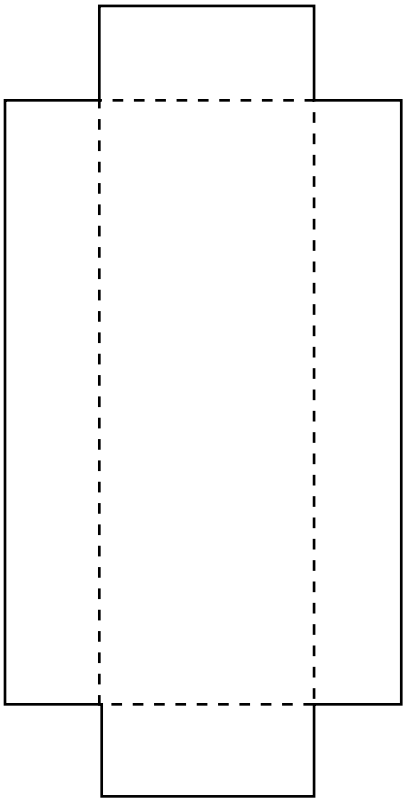


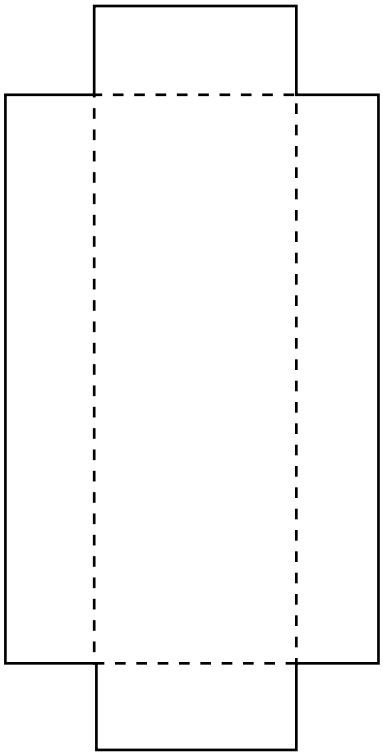
The lid is hinged partially by the board and partially by the cover stock.

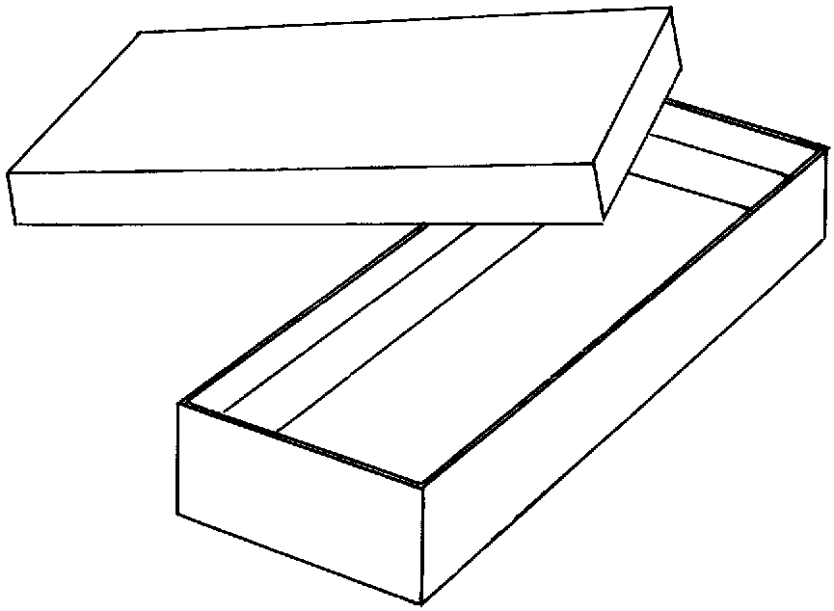


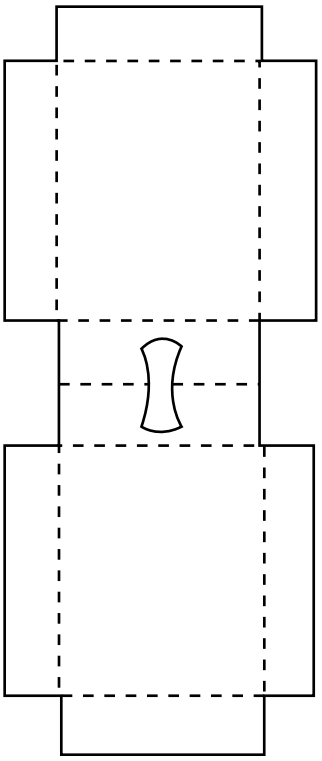


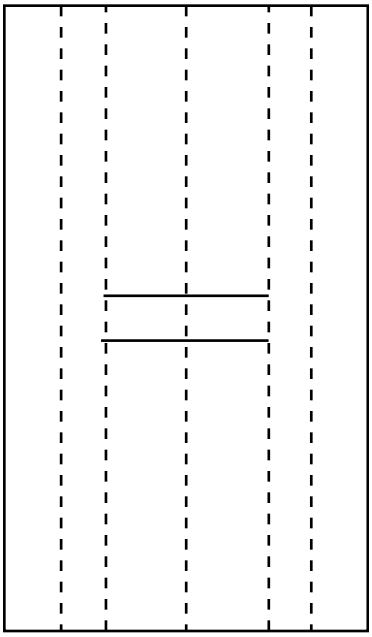
This is the pattern for the cover stock of the tapered tray with lid.



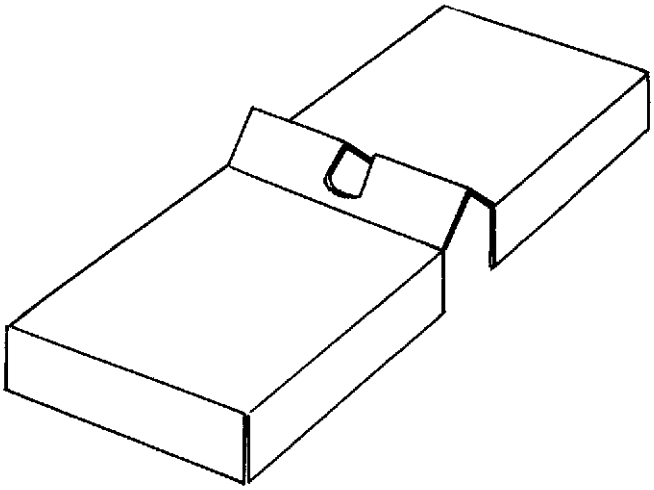


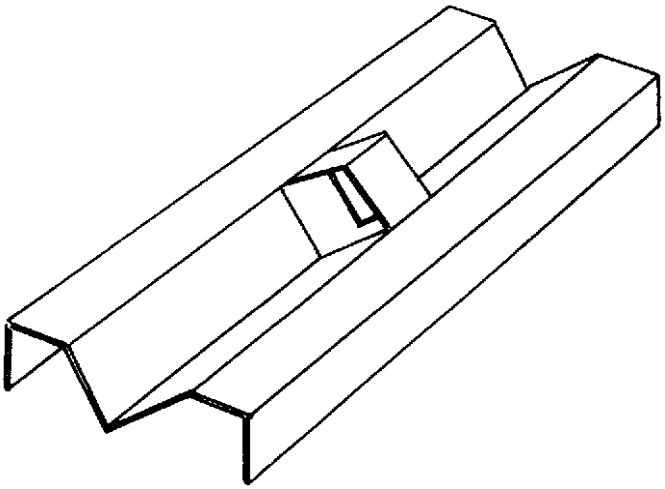


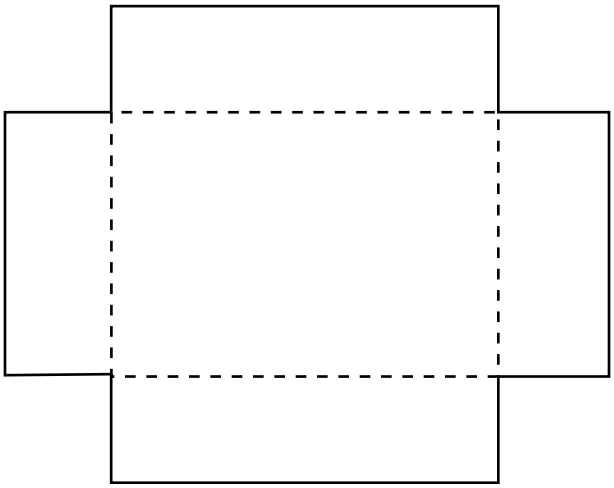


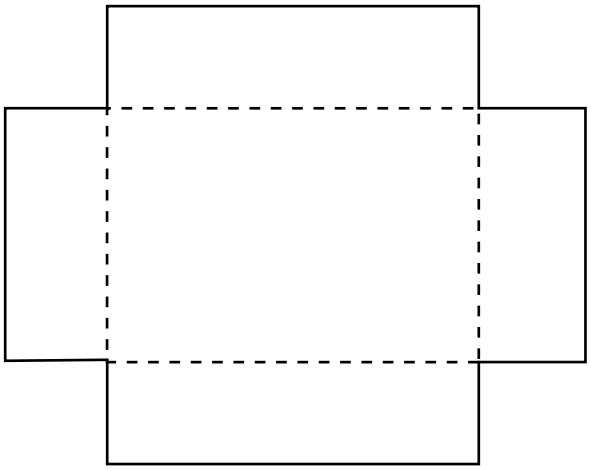


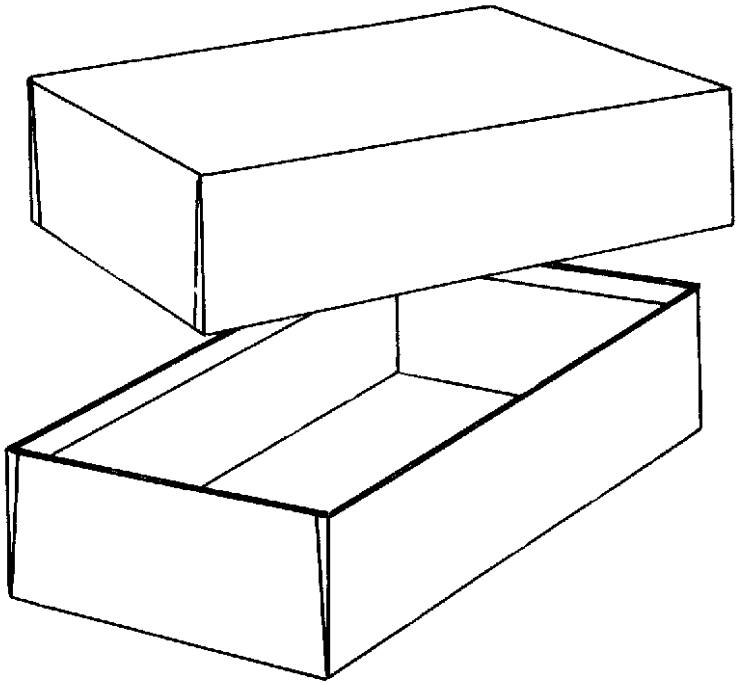
These are inserts for the tray illustrated on the preceding page. The top would be a typical insert for a souvenir spoon. The bottom insert would be for an item such as a pen.

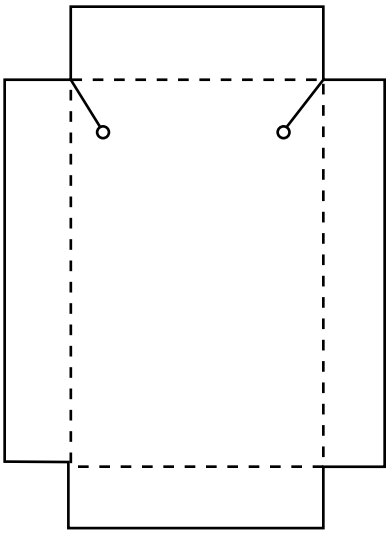




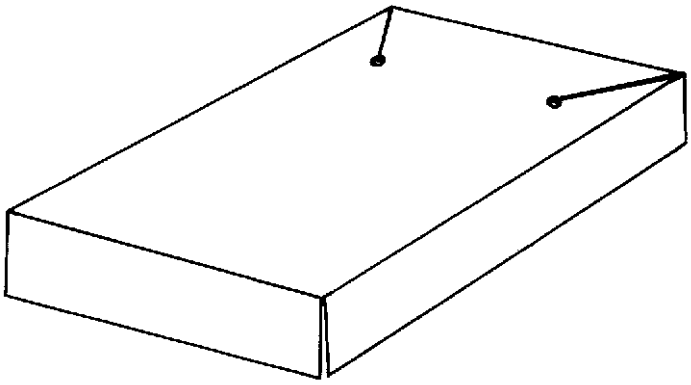


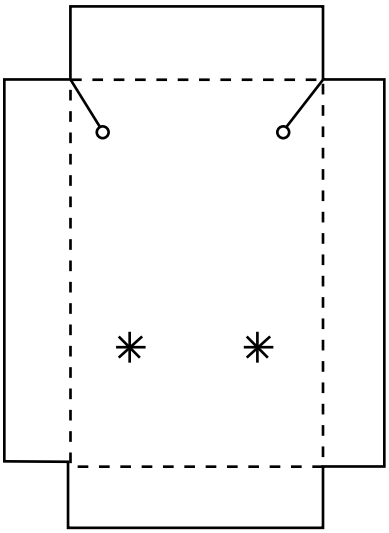




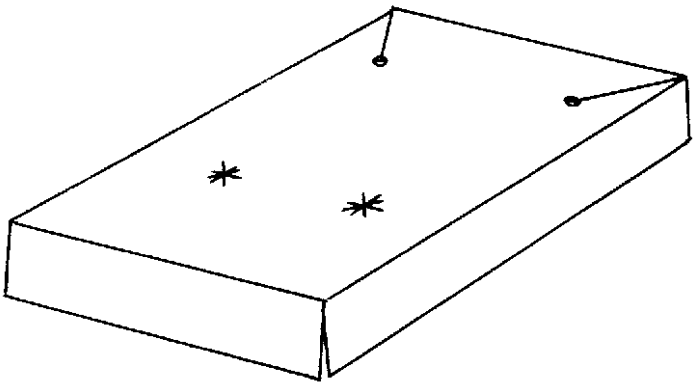


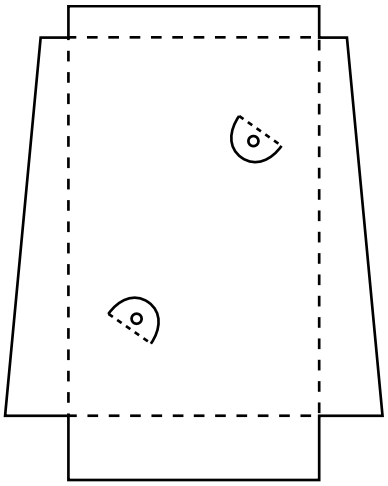
A platform for the box illustrated on the preceding page. This would be ideal for a necklace.



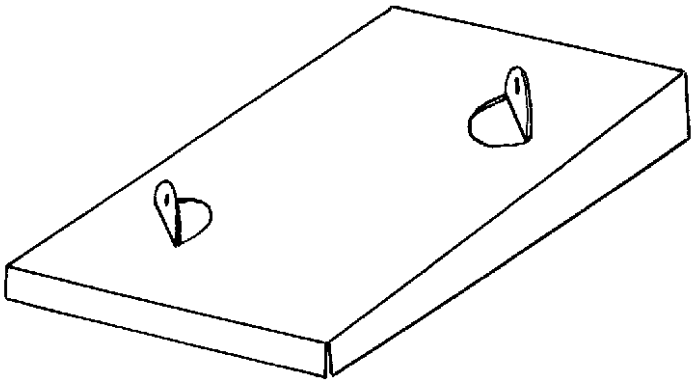


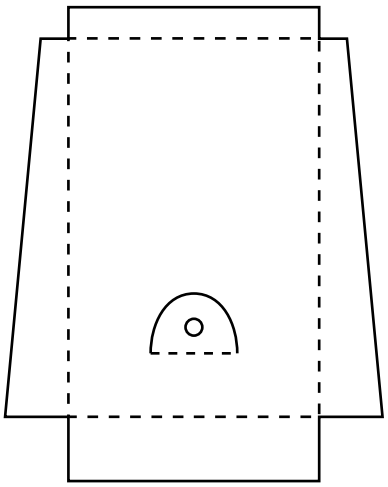
A platform for necklace and earrings.

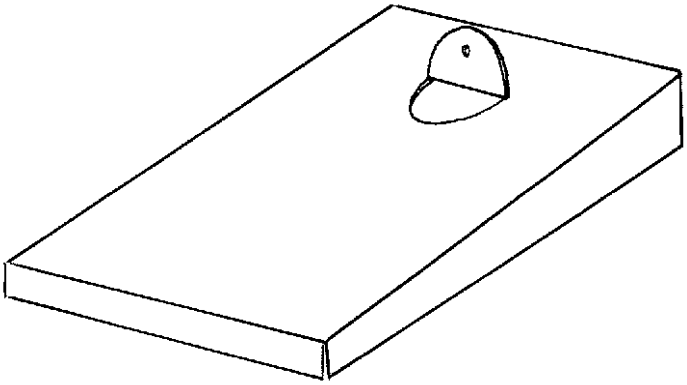


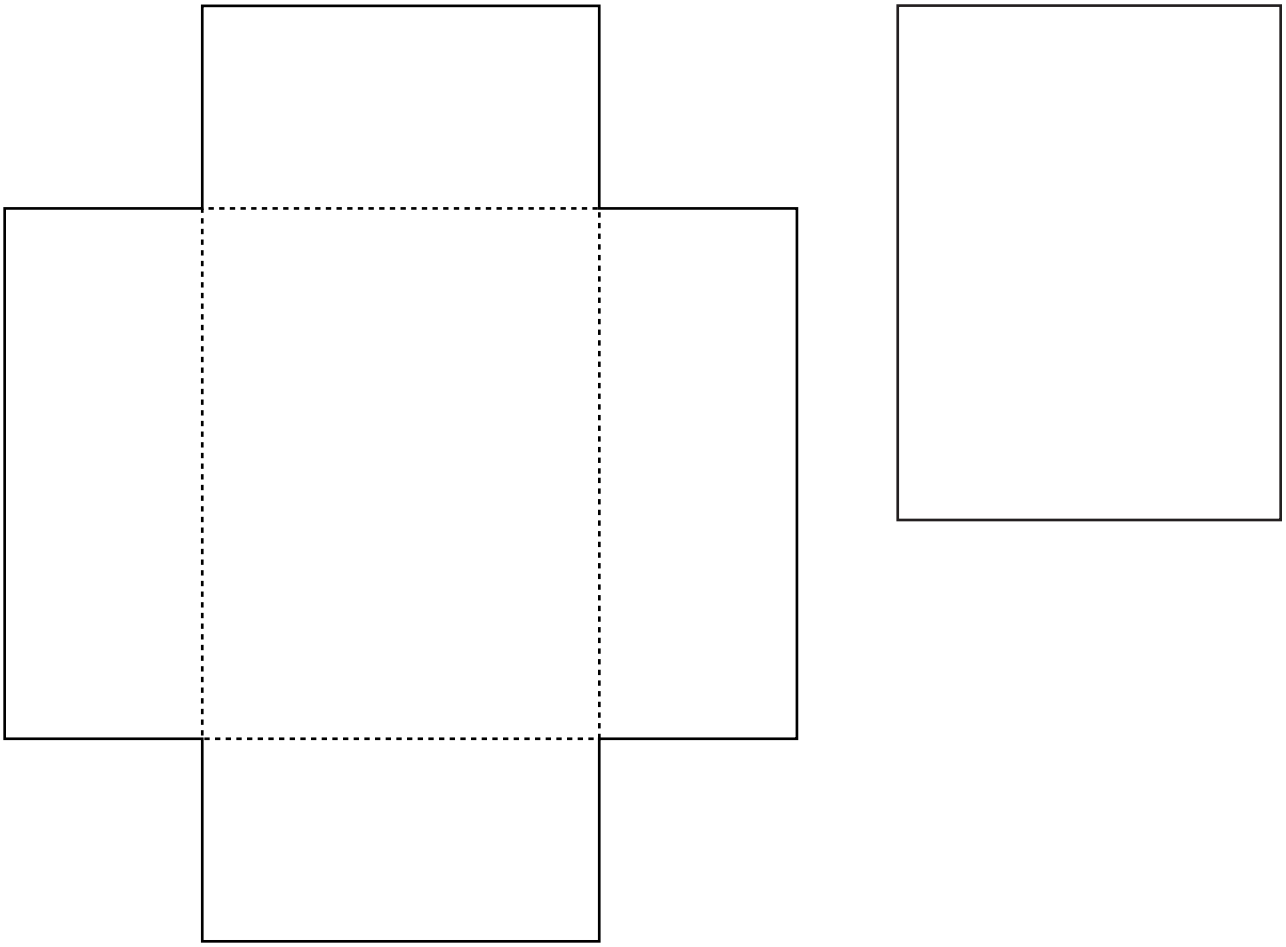


Slanted platforms for jewelry such as a tie pin or stickpin.

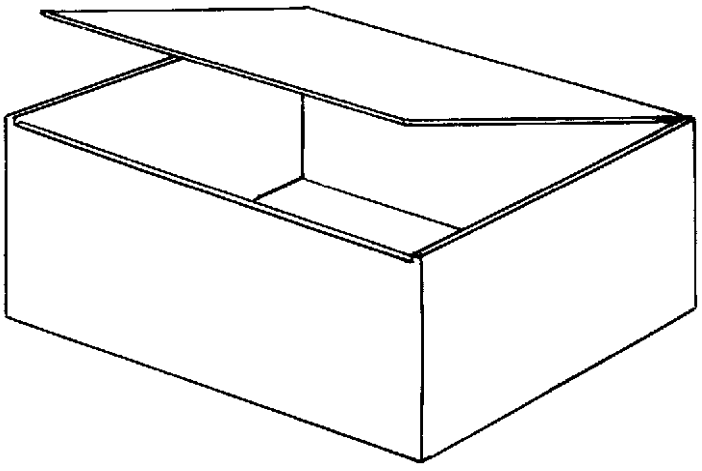


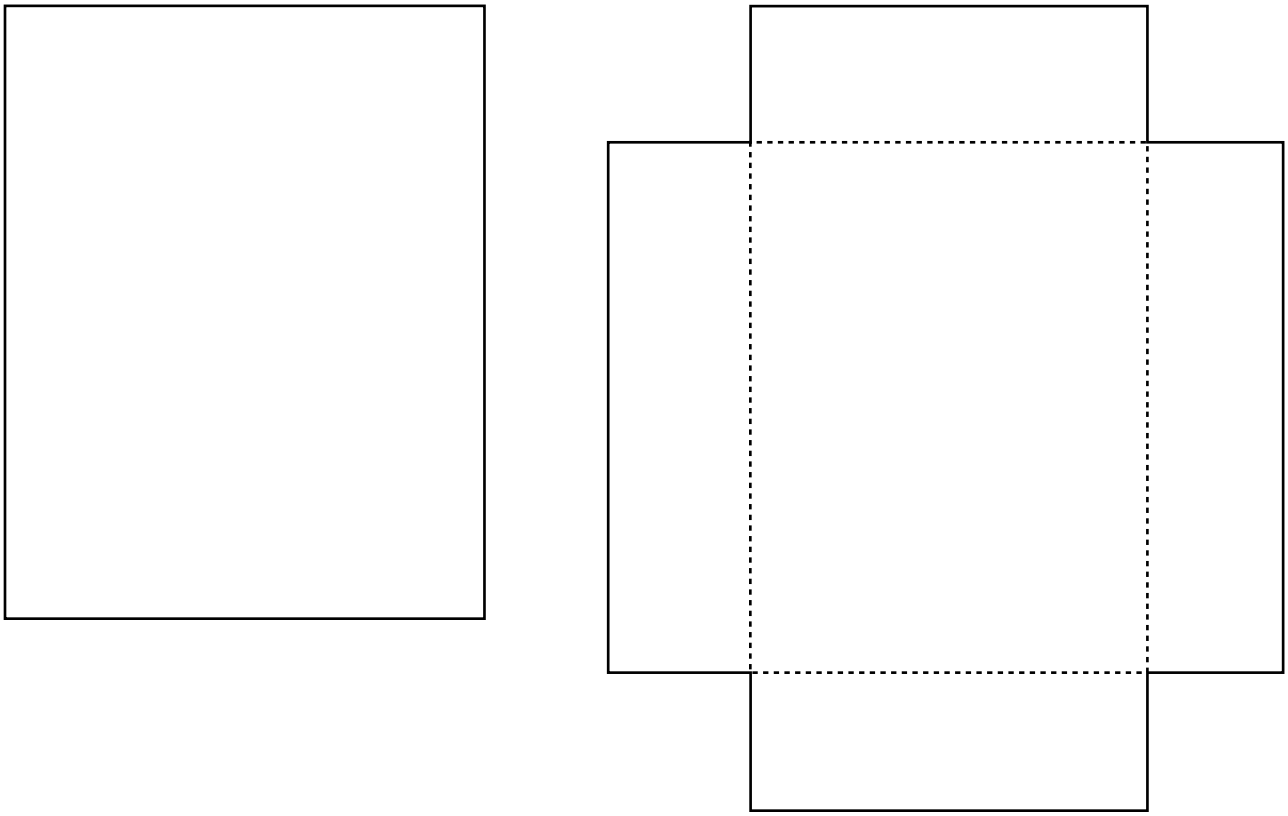




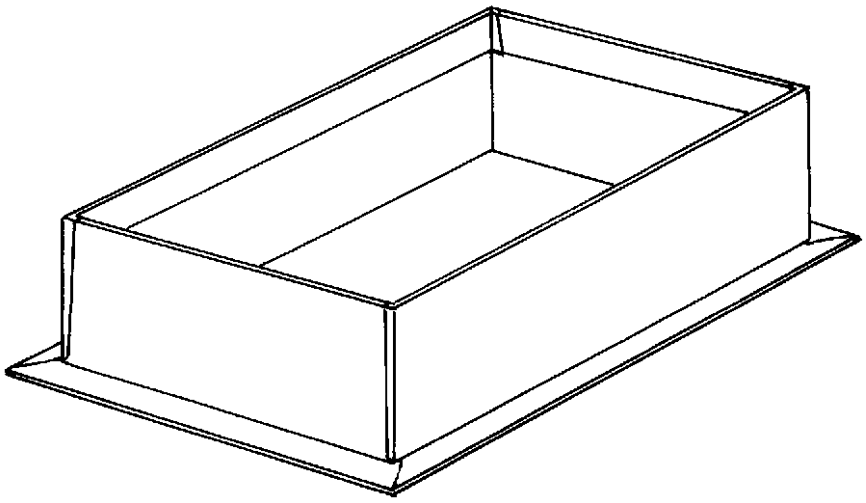


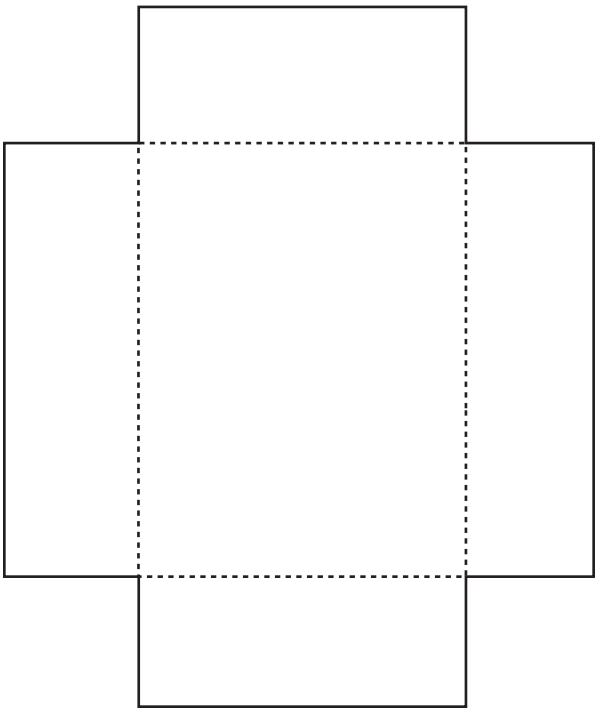
This box has side panels that are slightly higher than the front and back. Once the lid has been attached with hinging tape and/or the cover stock, the front of the lid will rest on the top of the front panel.

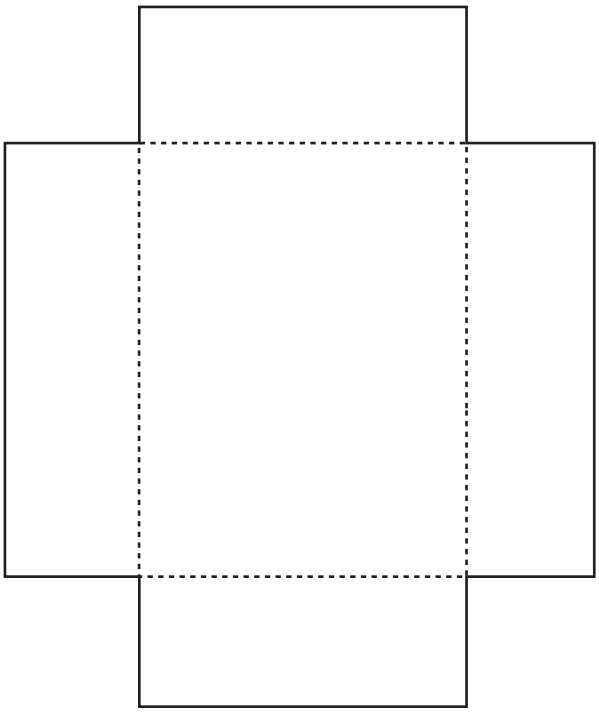


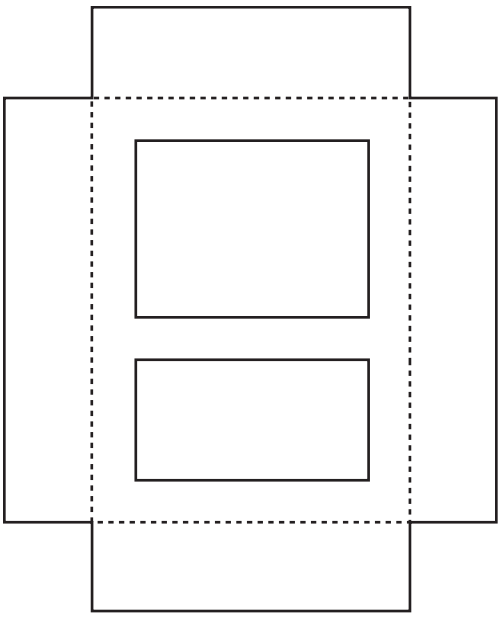


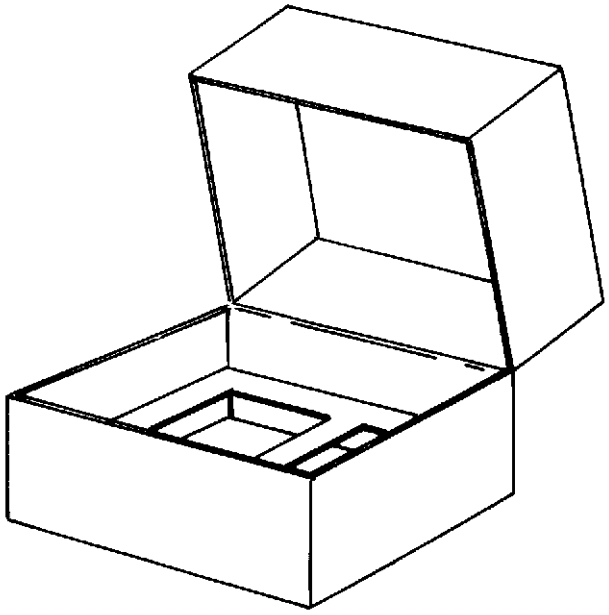
The tray is assembled and glued to the platform. Then the assembly is covered with cover stock.

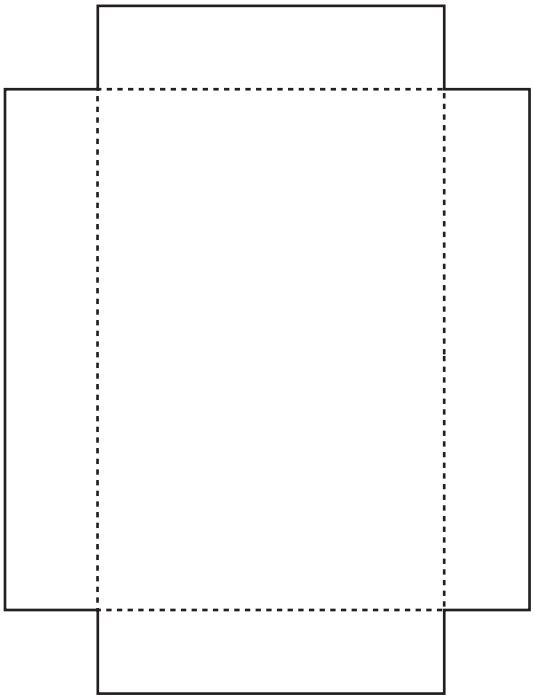


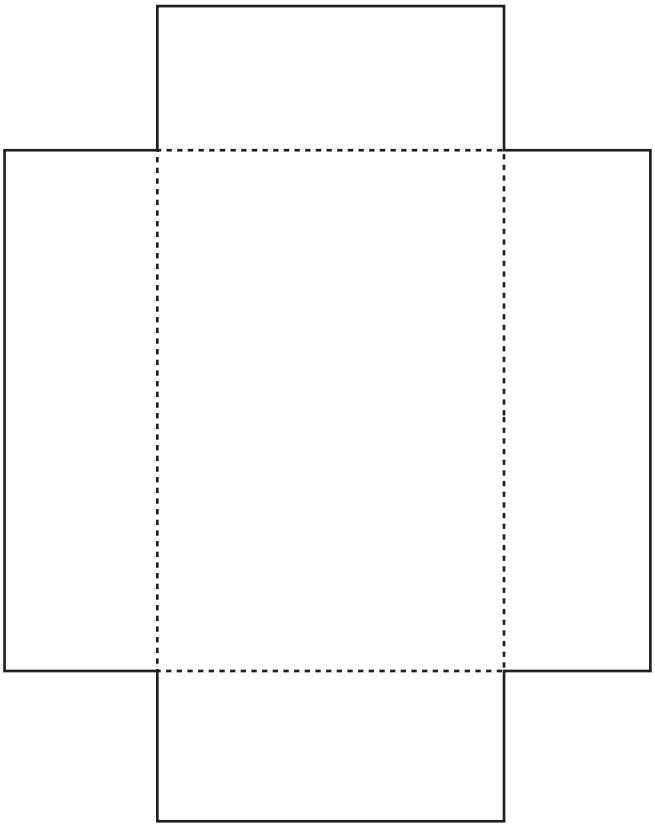


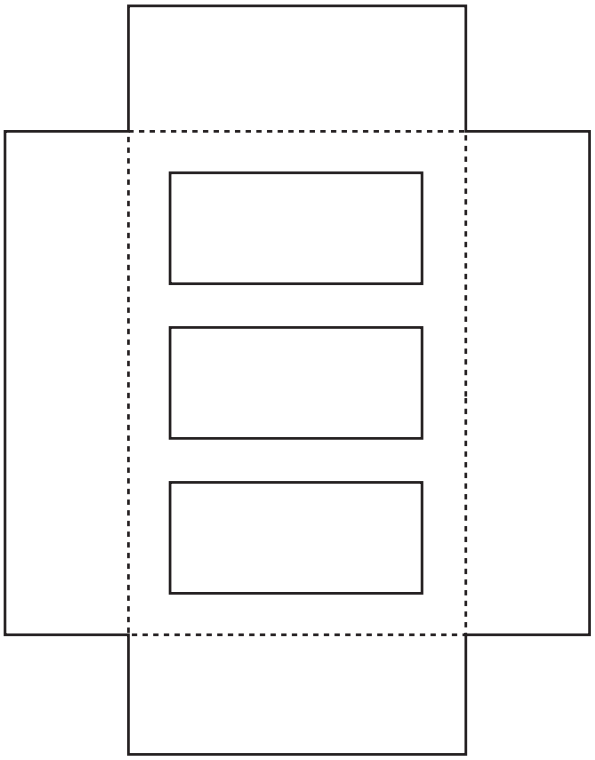


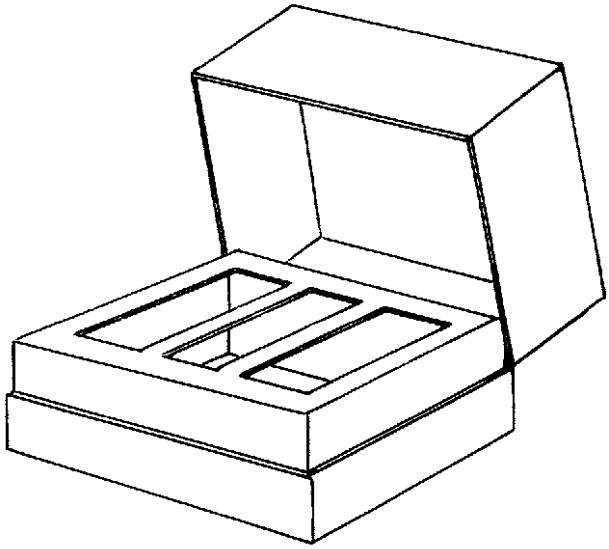


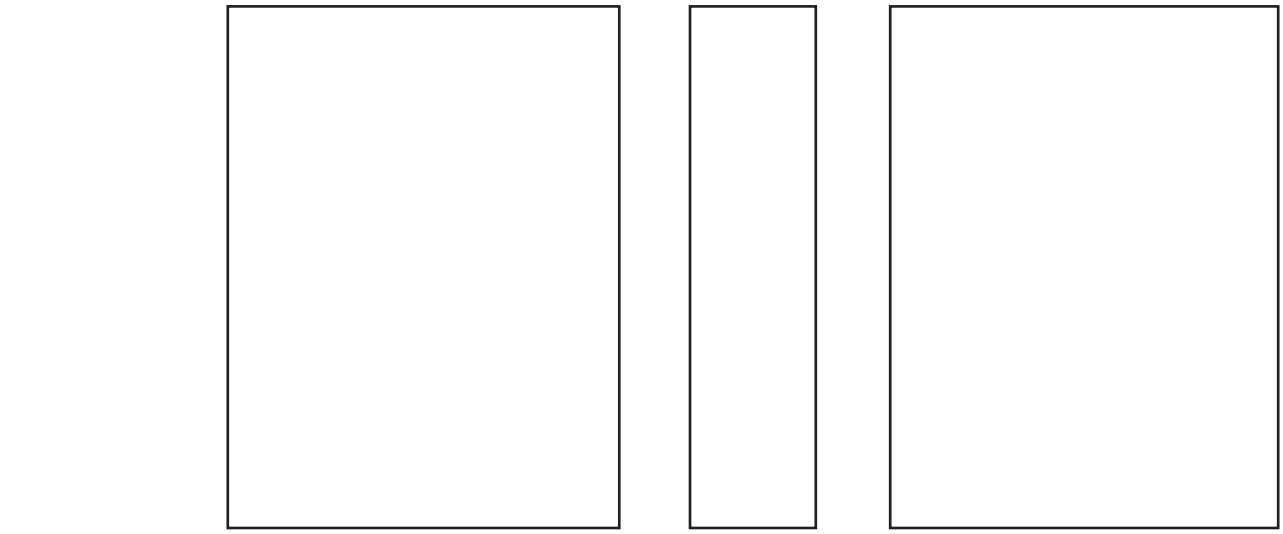


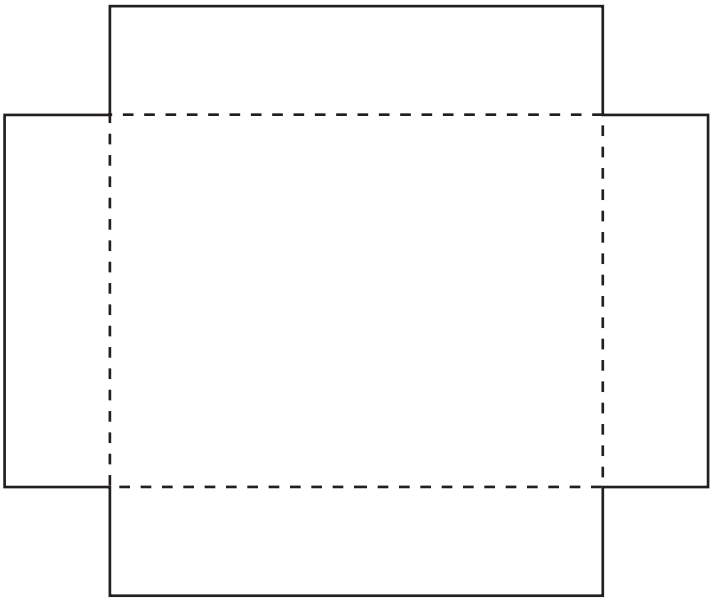


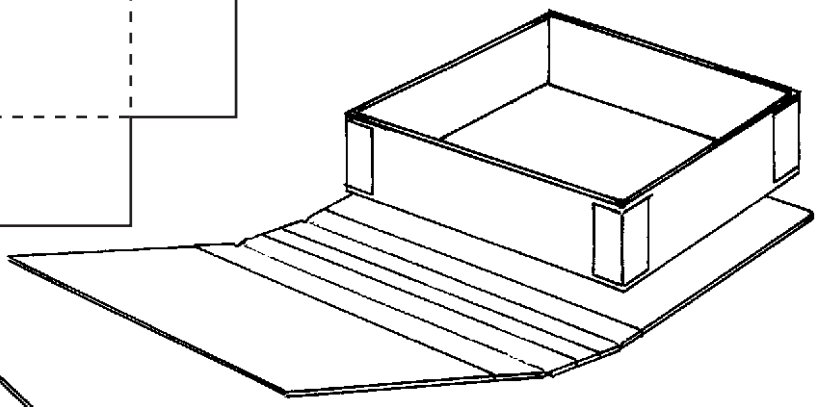


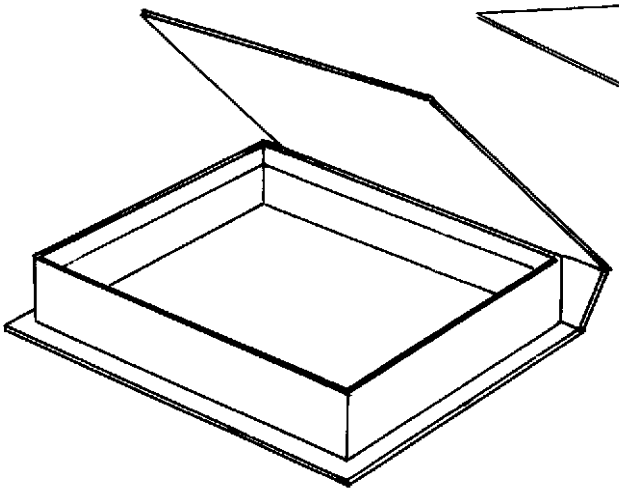






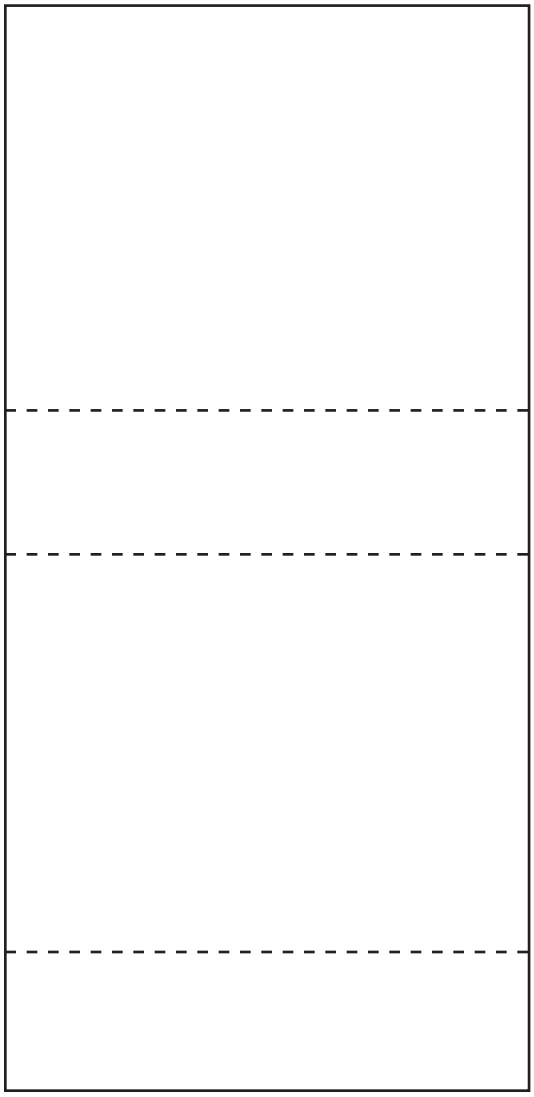


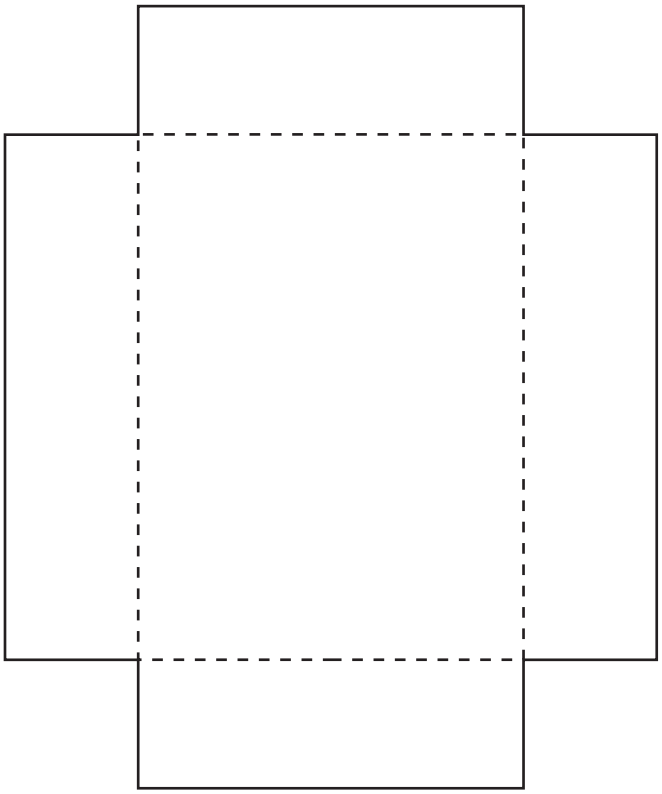




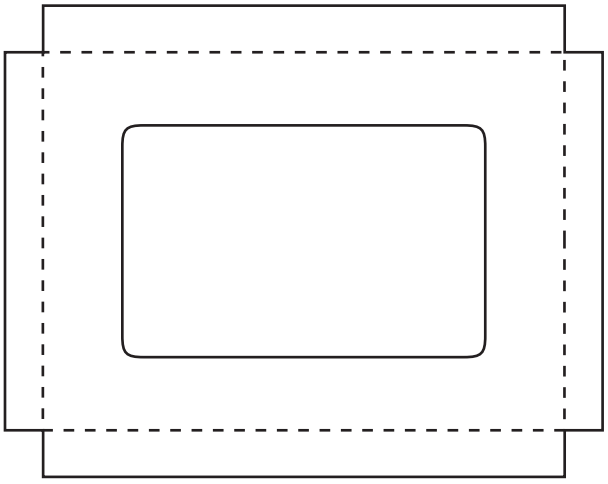
The three pieces that form the outside of the box have been fastened together with hinging tape, then covered.

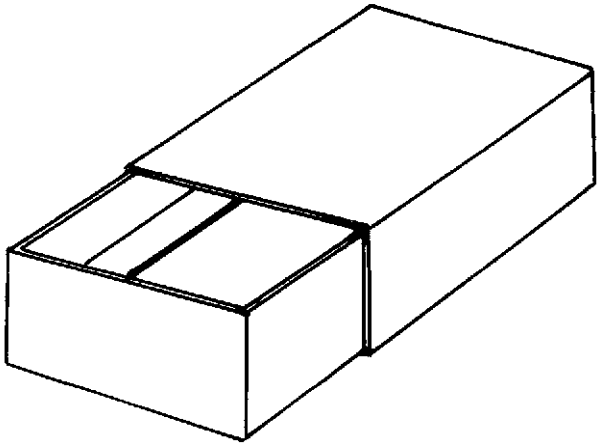
This box simulates a book; the spine may be shaped in order to carry the illusion even further.

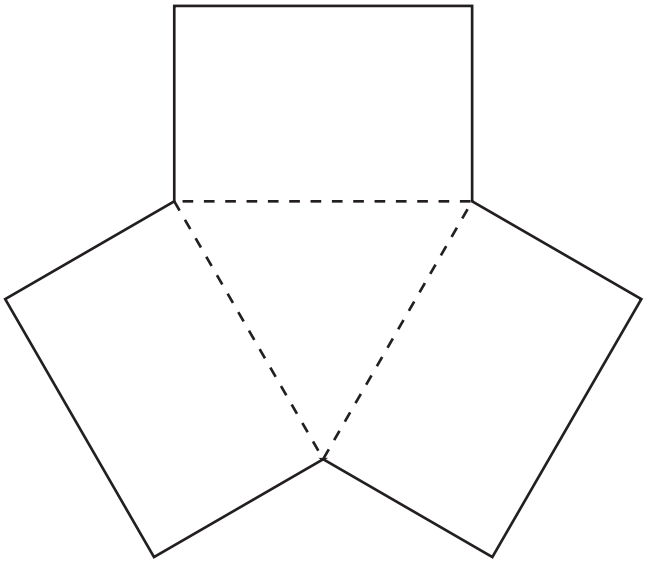


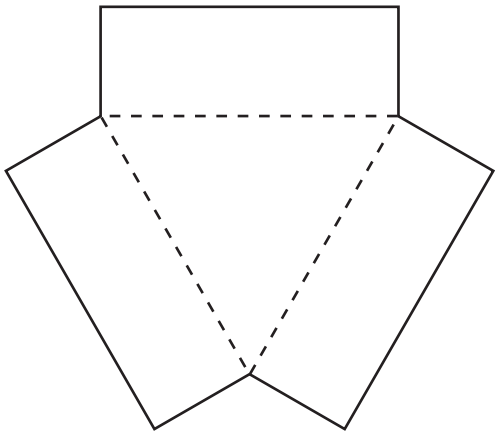


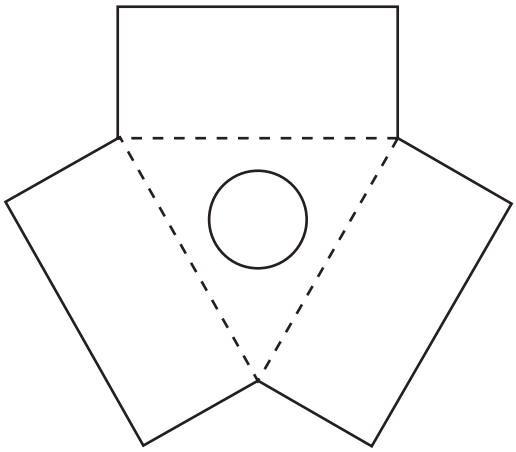
The platform may be die-cut to fit the shape to be packaged.

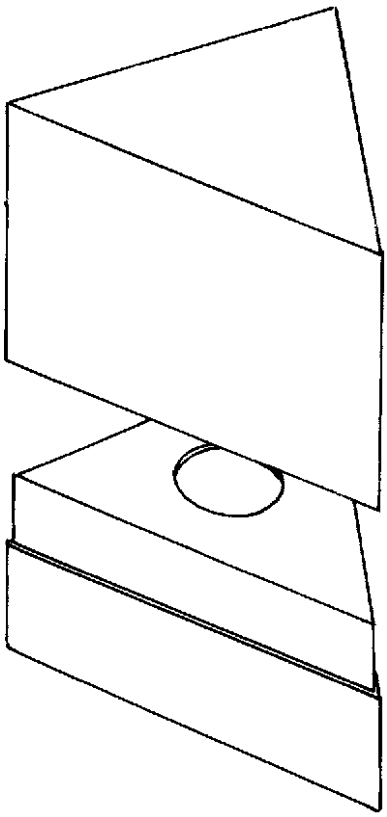




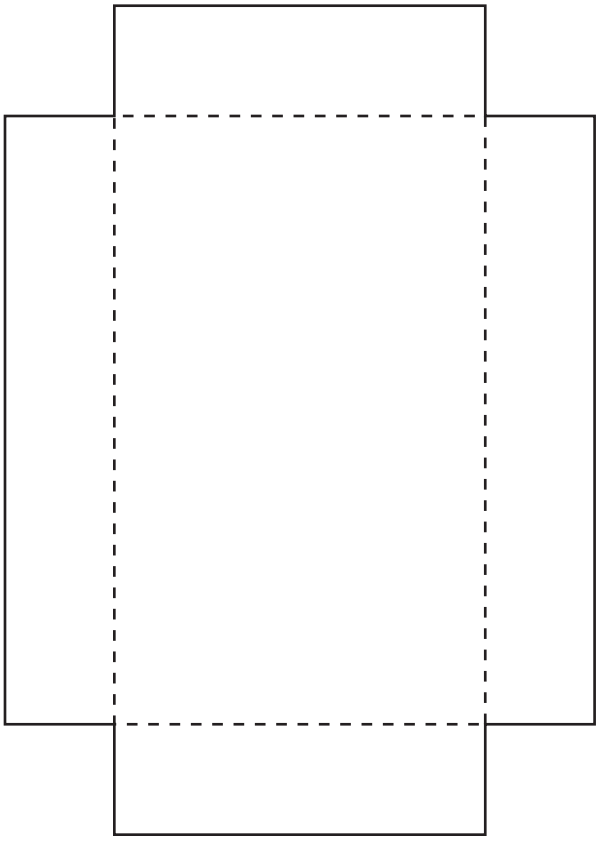


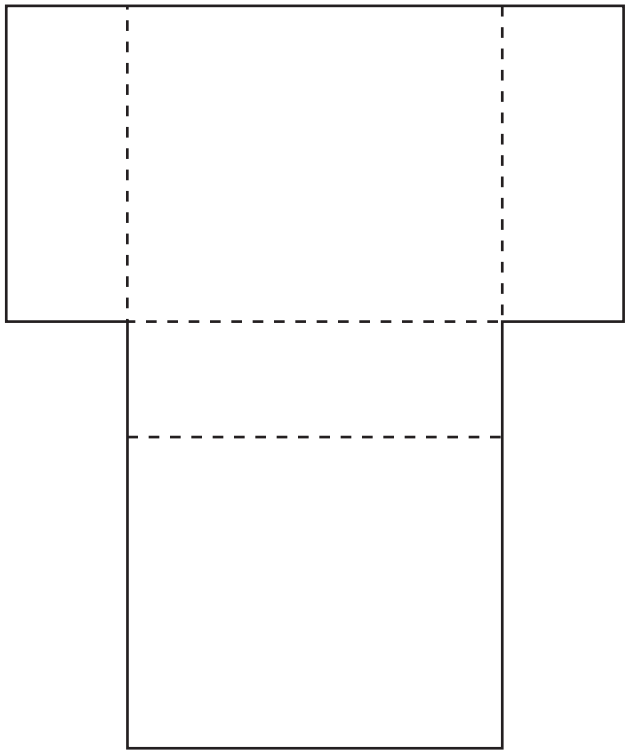


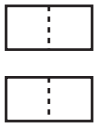


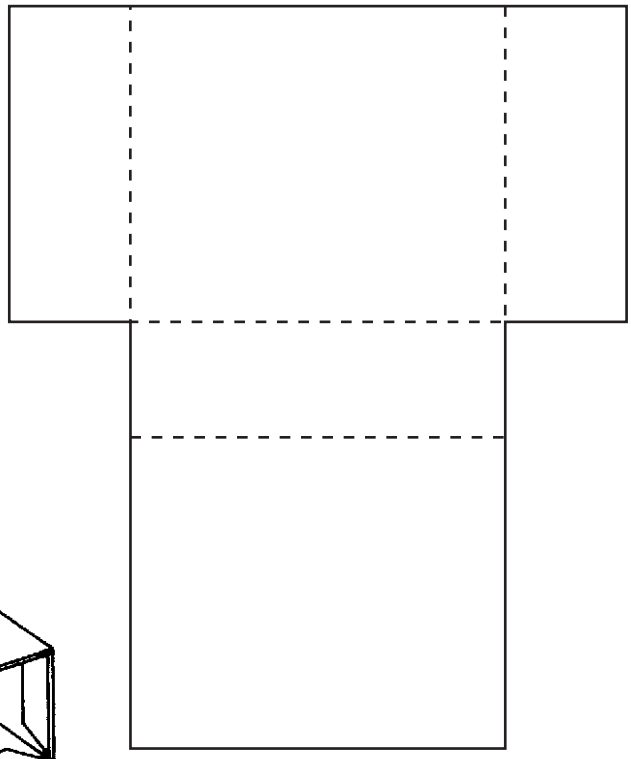


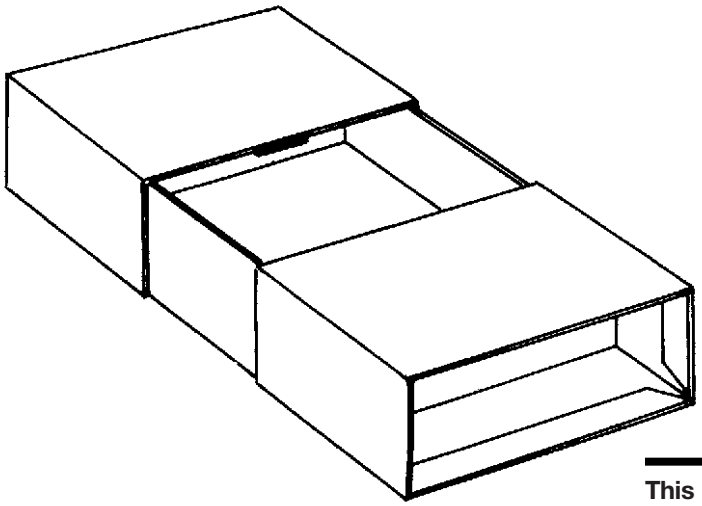
Set-up boxes may be manufactured in many shapes. This triangular box with raised platform is only one of the many geometric possibilities.



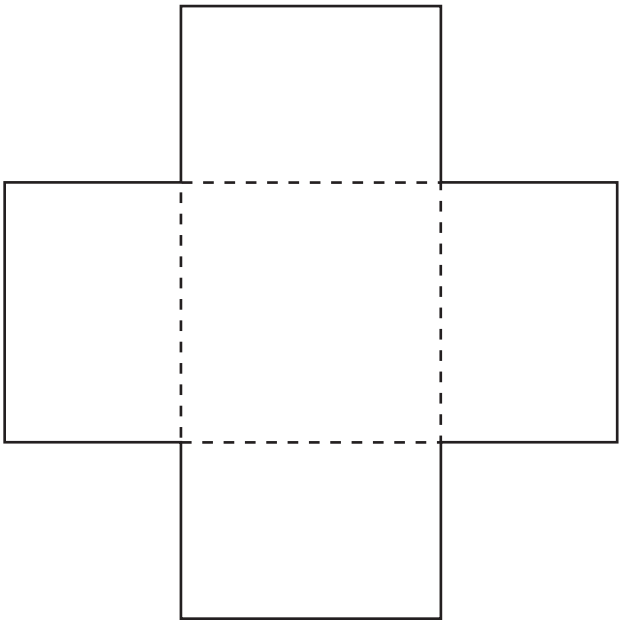


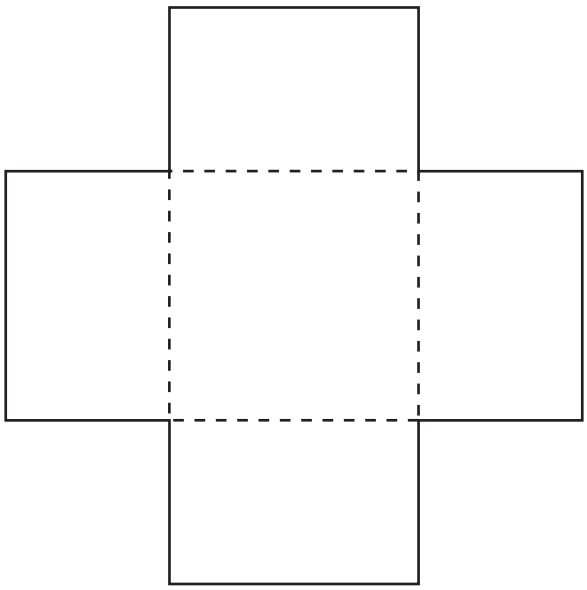


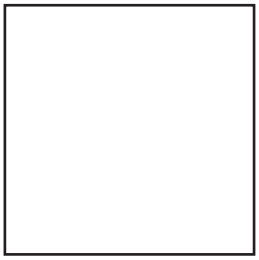




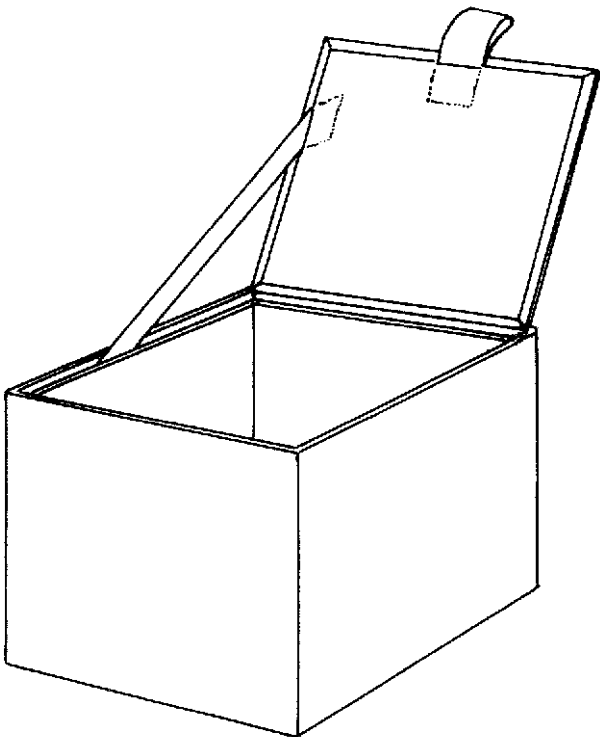
This tray and slide makes an interesting alternative. The small blocks may be inserted in the sleeves after complete assembly so as to prevent the tray from being pulled all the way out of the sleeves. A platform of any shape may be inserted.

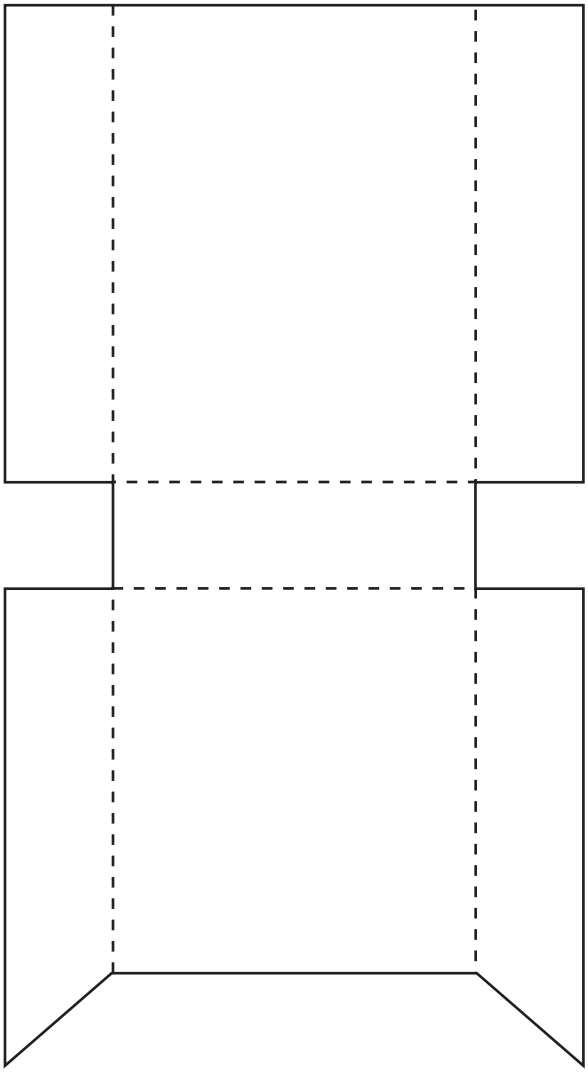


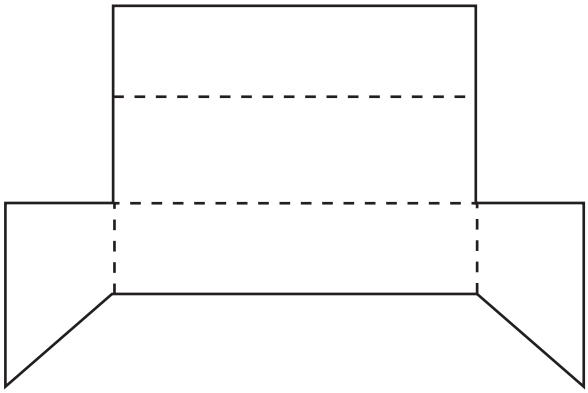


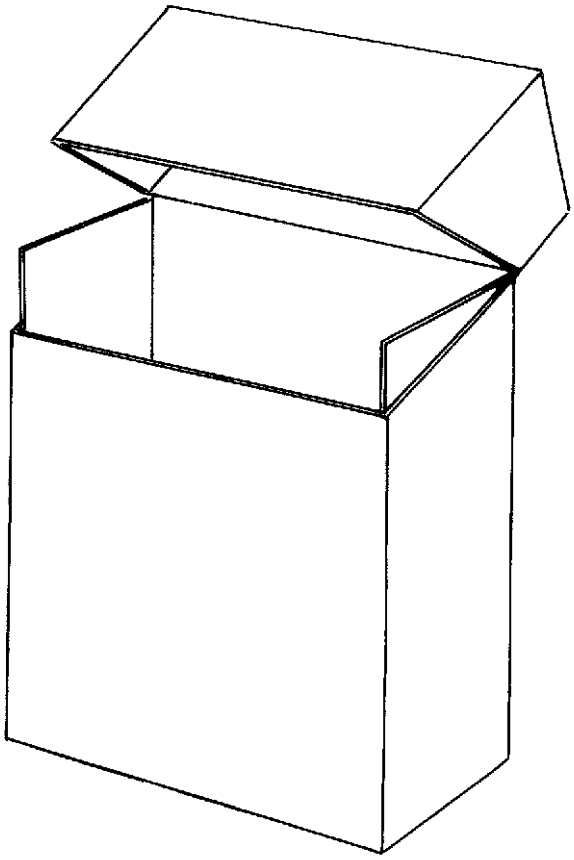


This three-piece box has a separate lid that has been attached with hinging tape and rests on the insert when closed. A small piece of ribbon has been attached to the lid under the cover stock as an opening device. Another ribbon could be attached to the lid and side panel to keep the lid from opening too far, as well as the keep the lid in an open position.

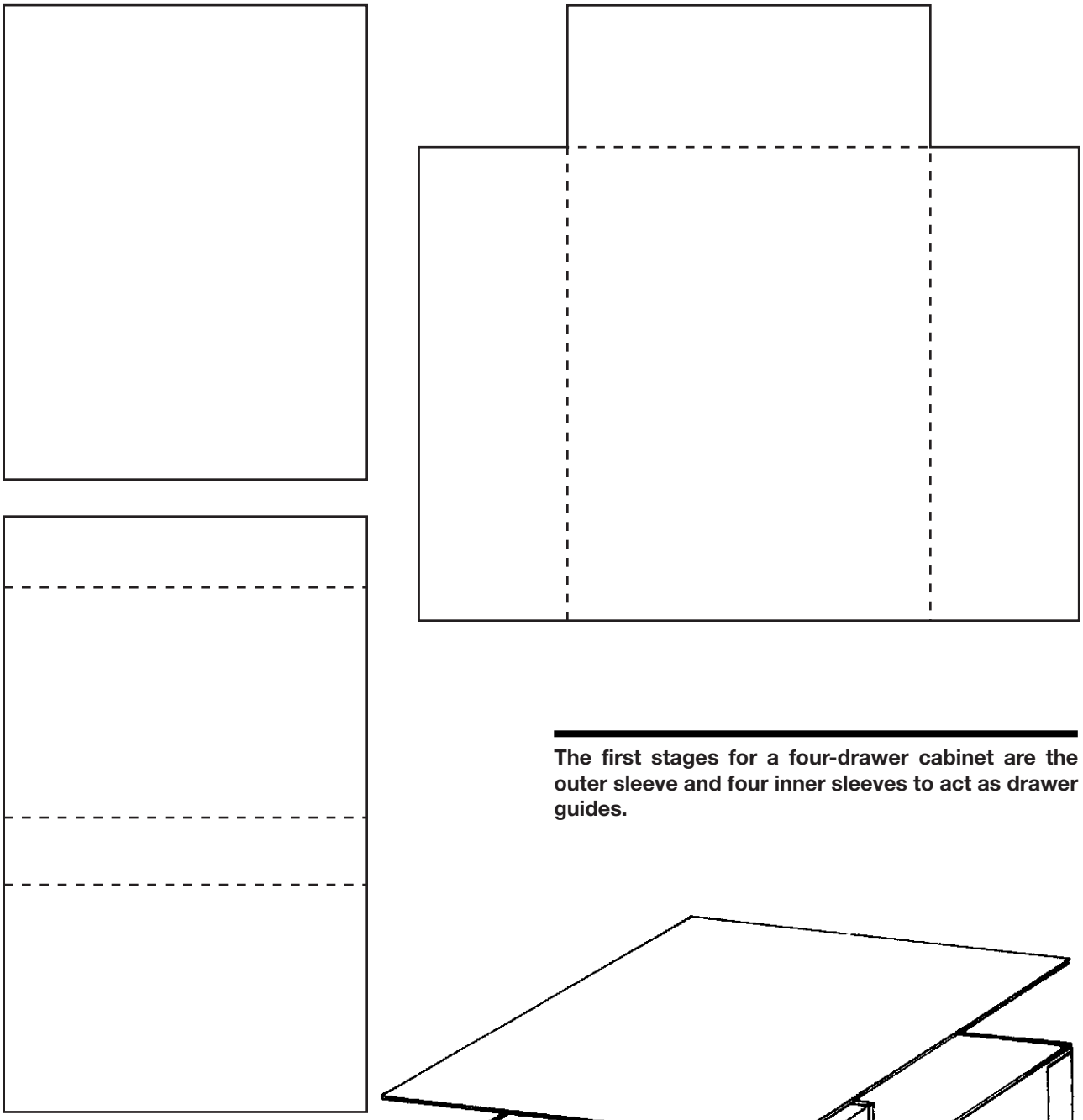




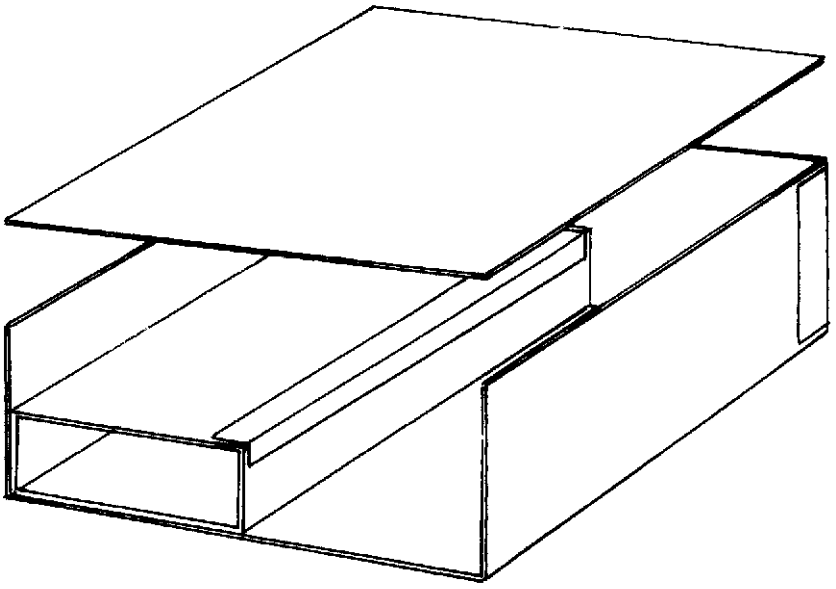


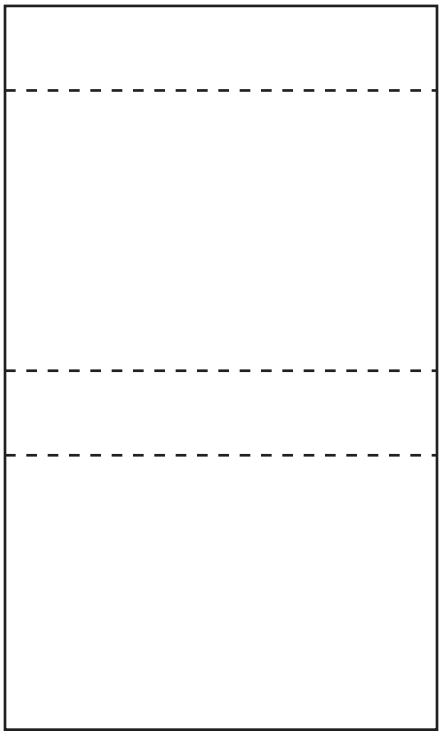


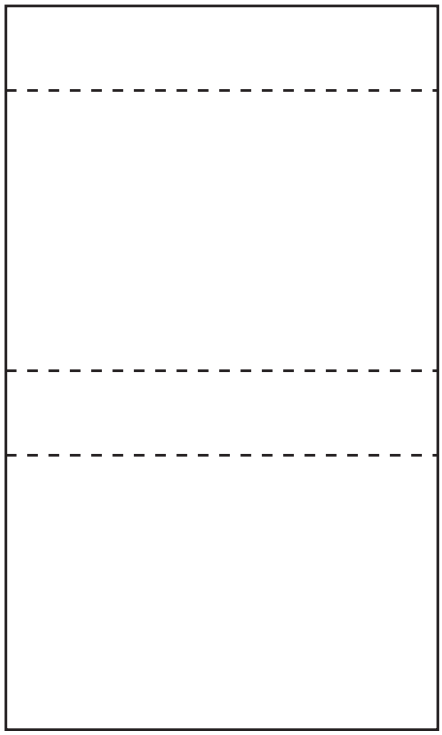
This file box may be used for documents, diskettes, or, with the proper insert platform, cosmetic items.

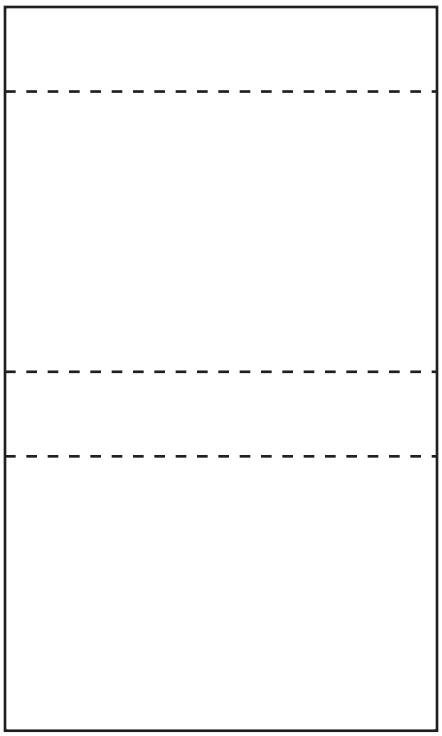


The first stages for a four-drawer cabinet are the outer sleeve and four inner sleeves to act as drawer guides.

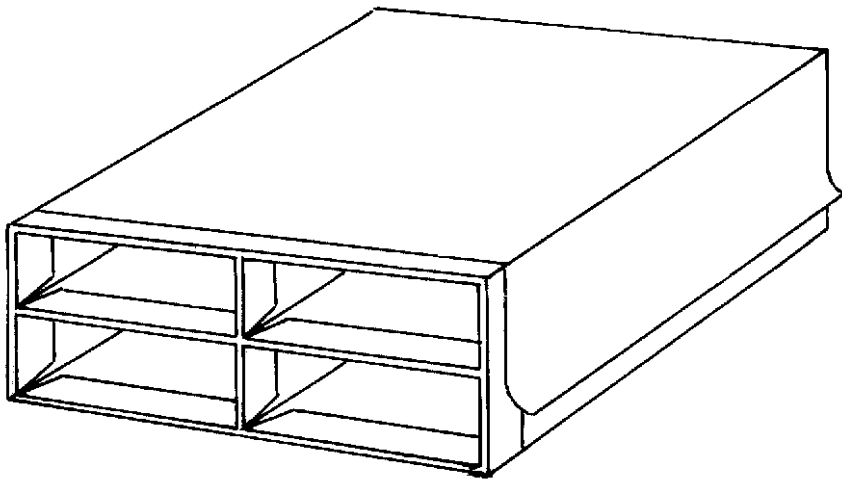


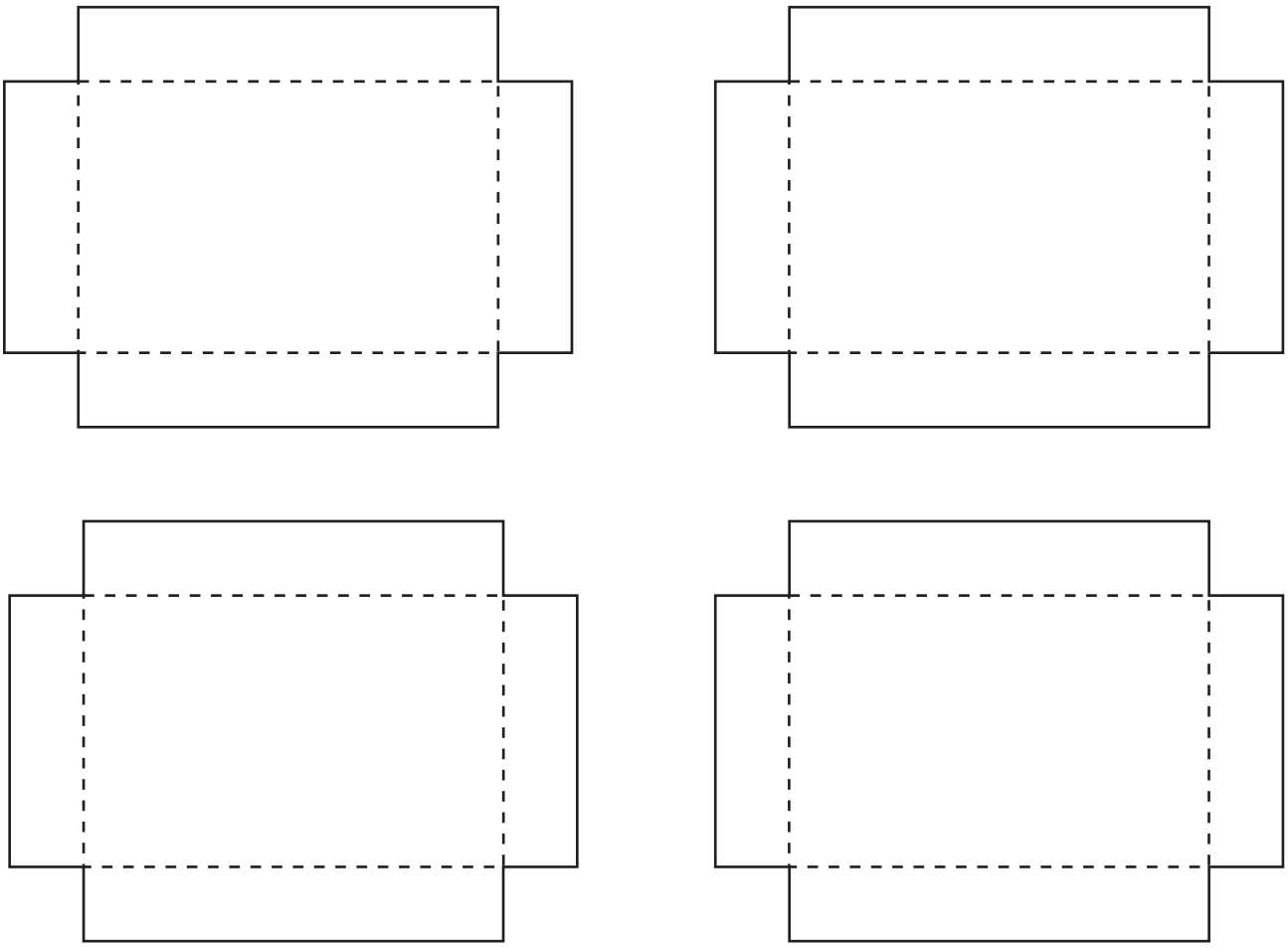




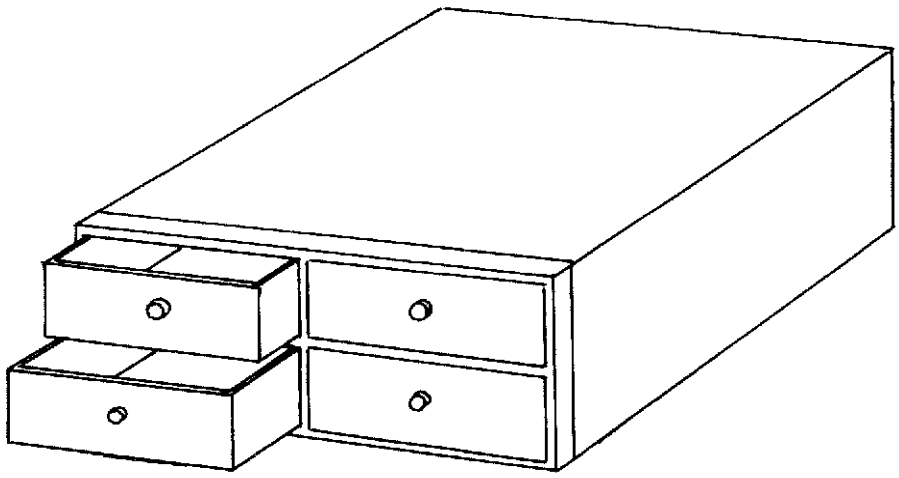


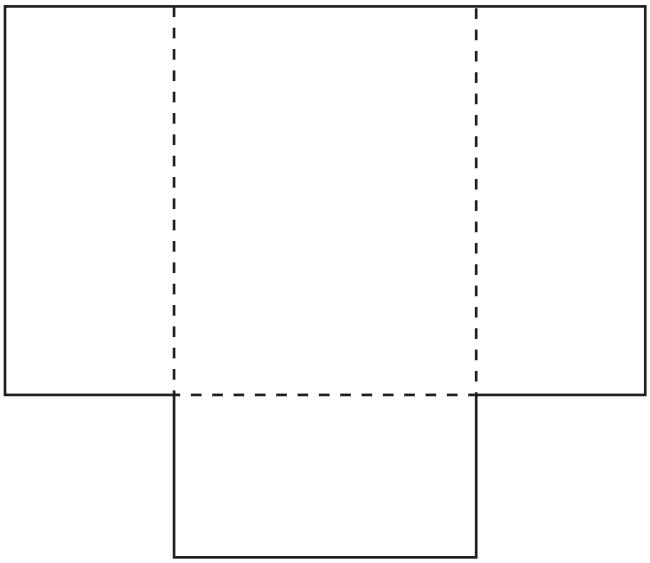
Upon assembly, the face of the drawer guides may be covered with cover stock. Then the outer sleeve is covered with either the same or a contrasting cover.

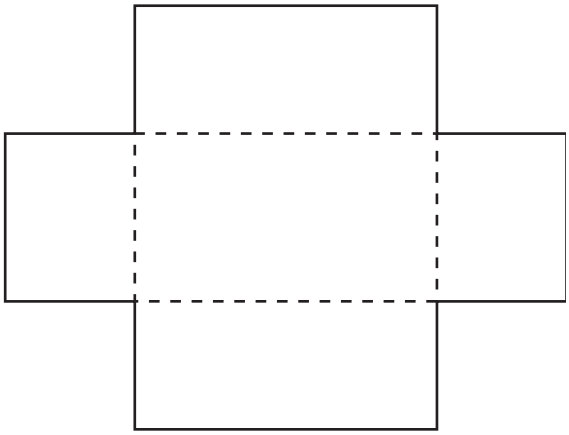


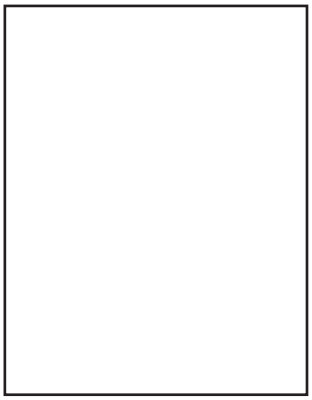


The drawers, when assembled, should be covered and checked for a snug fit. Any available hardware may be used as drawer pulls.

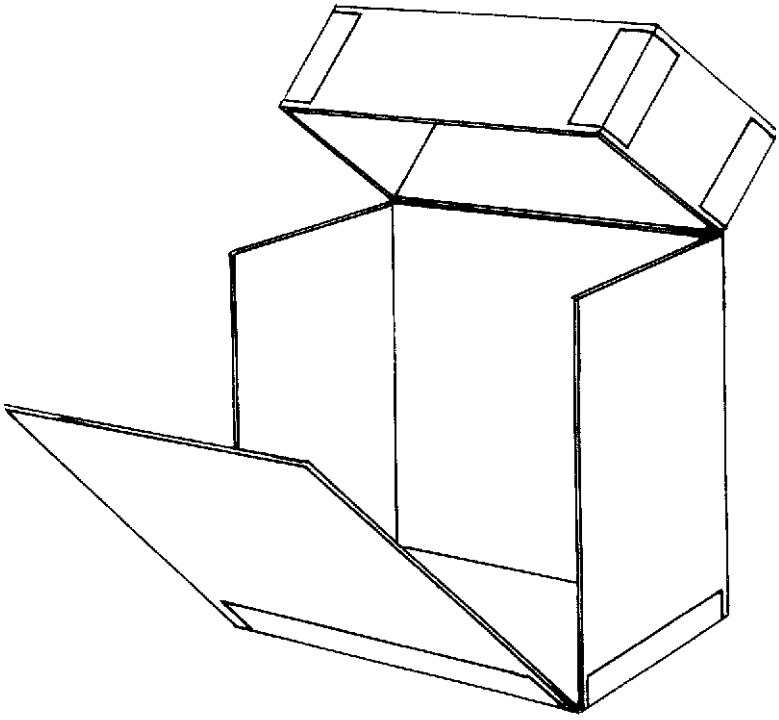


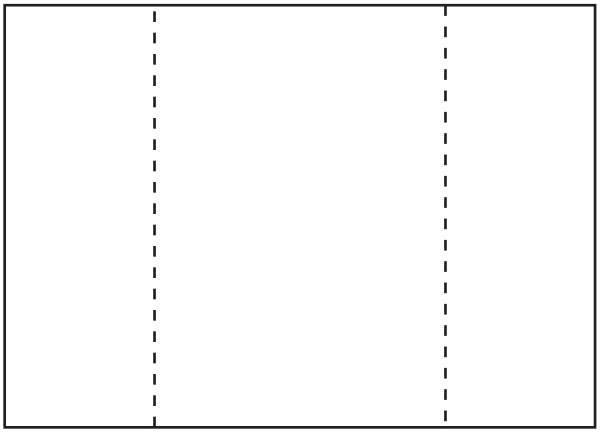


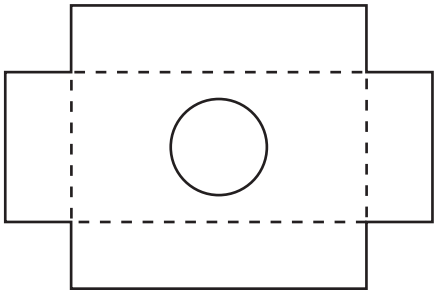


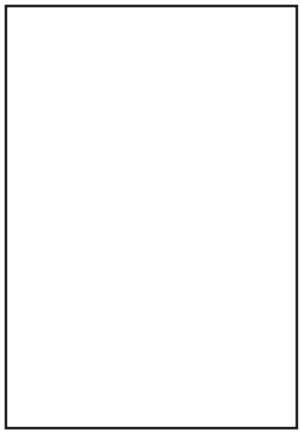


The first stage of this box, which has eleven separate components, is the assembly of the box, lid, and front panel lid. The cover and lid are attached with hinging tape, then covered with cover stock.

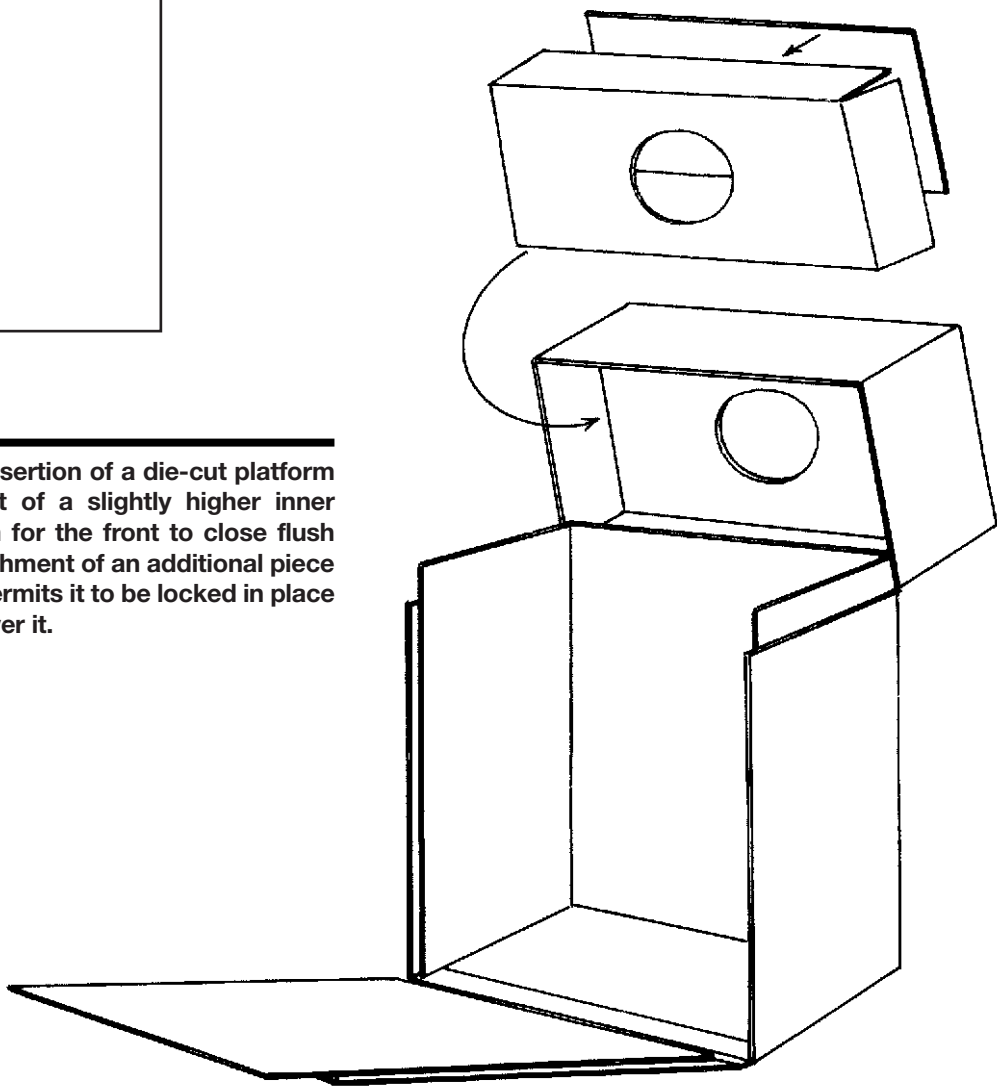


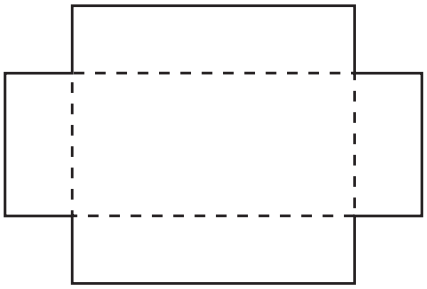


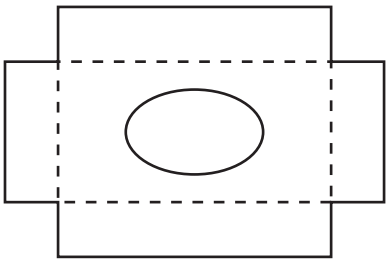


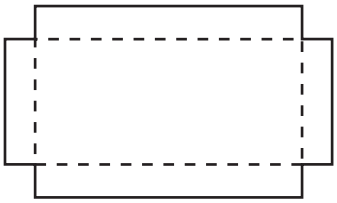


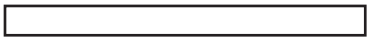
Subsequent steps are insertion of a die-cut platform into the lid, attachment of a slightly higher inner sleeve that allows room for the front to close flush with the sides, and attachment of an additional piece to the front cover that permits it to be locked in place when the lid is closed over it.

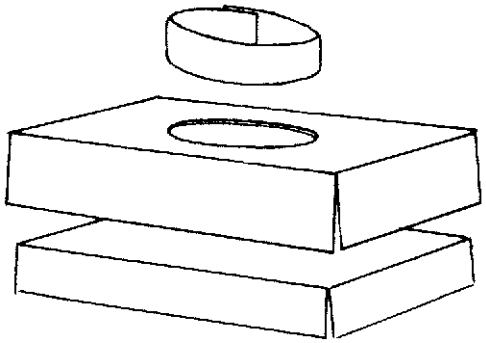


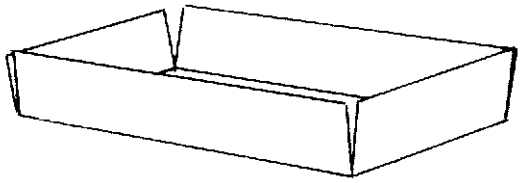




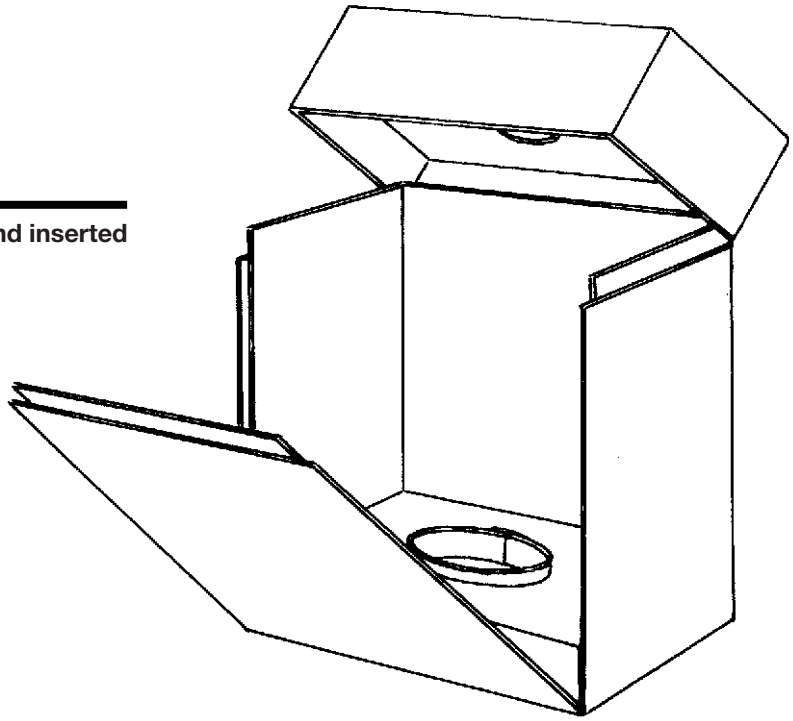


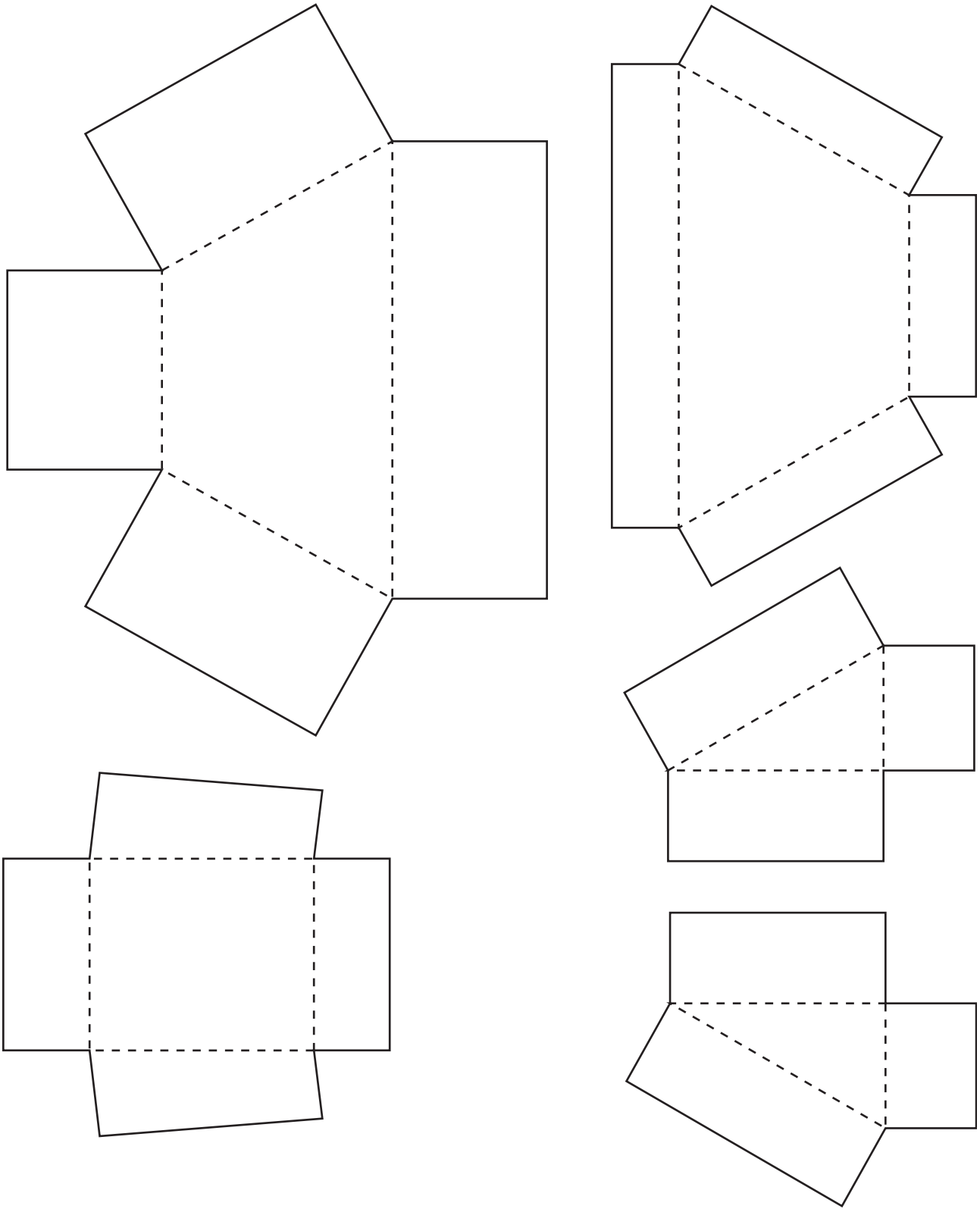




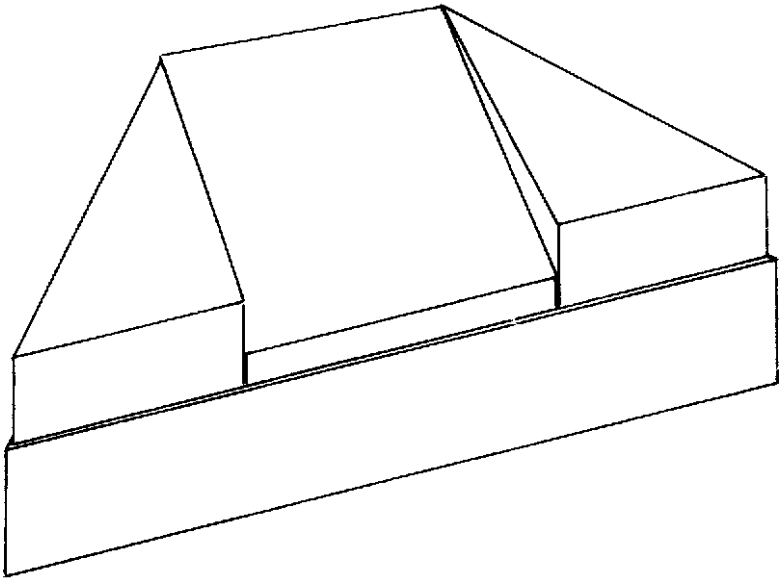


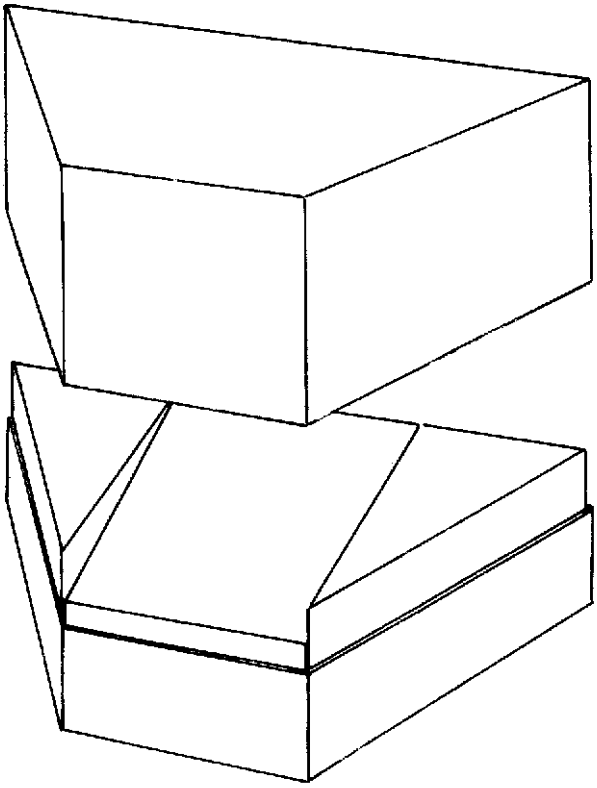
Finally, the base platform is assembled and inserted into the bottom of the box.





Many varieties of platforms may be assembled in order to create visual excitement.

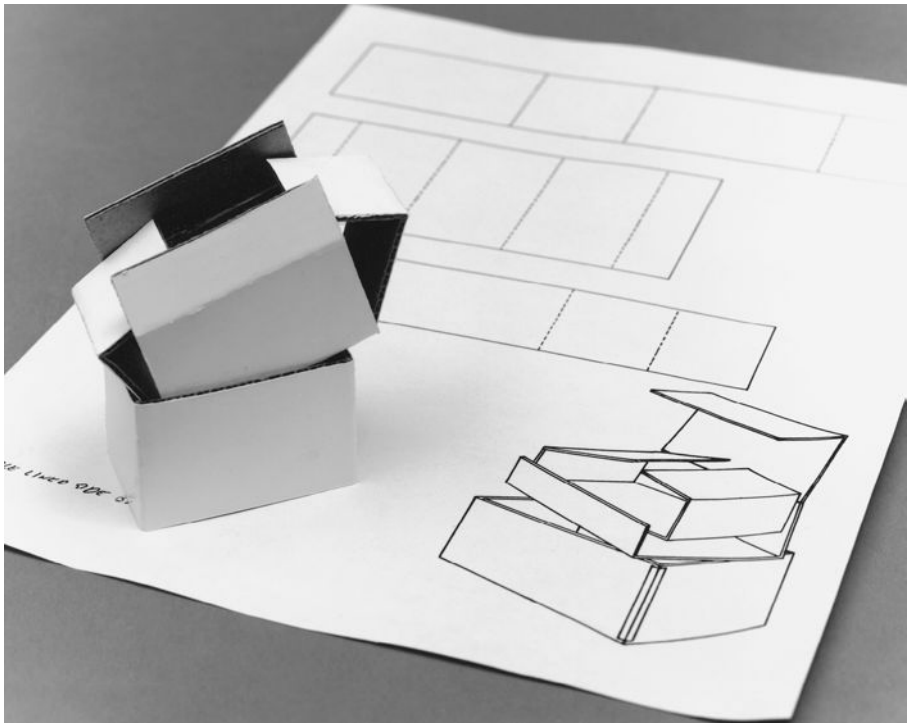




As long as the platforms have been made to the correct size, they may be inserted in various directions. In this example, the front of the set-up box may be oriented either way, and the lid may be attached accordingly.

4

Corrugated Containers

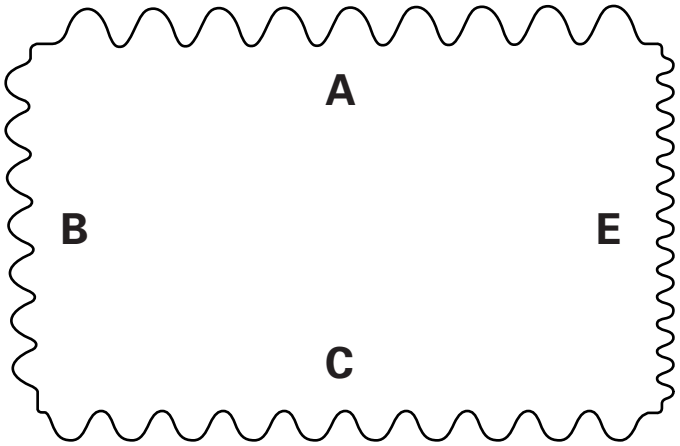


Fluted medium, the heart of the corrugated board, is one of the most unusual of all packaging materials. Originally, it was an article of wear. In the mid-nineteenth century, men's hats were fashioned with a sweatband of fluted paper. In 1871, an American, Albert L. Johnes, patented fluted medium for the protection of bottles during storage and shipment. Three years later another American, Oliver Long, patented a process for sandwiching the fluted medium between paperboard sheets. This was the origin of corrugated containers, the workhorse of the packaging industry.

THE STRUCTURE OF CORRUGATED BOARD

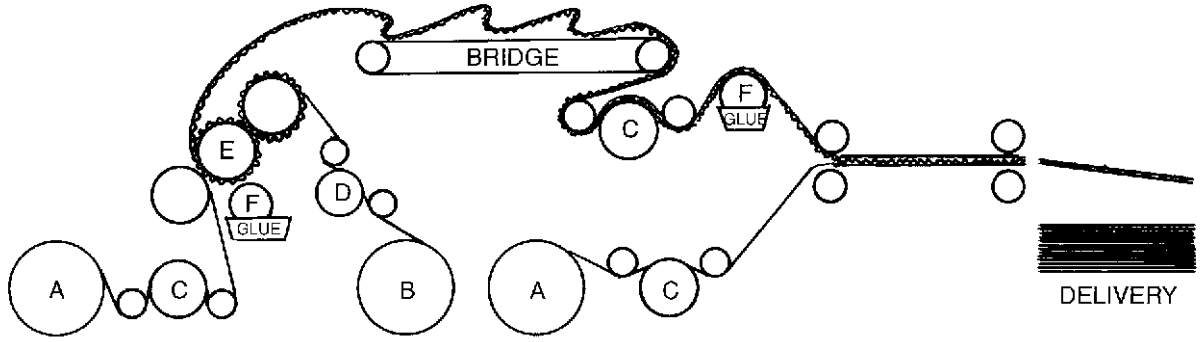
The basic structure of corrugated board is simple. It consists of a fluted sheet glued to one or more liners. The most common construction is a sheet of "corrugated medium" sandwiched between two liners. A wide variety of combinations are possible, depending on packaging requirements. Where great strength is required, the three sheets of medium can be combined with appropriate liners.

The structural characteristics of corrugated board are governed by four variables: (1) the strength of the liners, (2) the strength of the corrugated medium, (3) the height and number of flutes per foot, and (4) the number of walls (single, double, or triple).

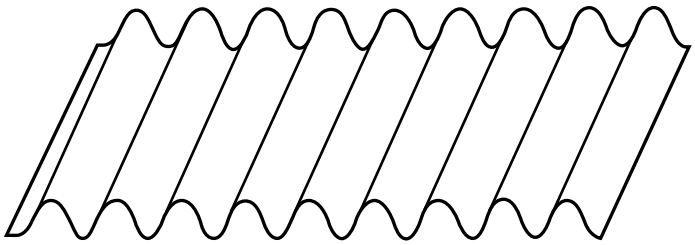


A corrugated flute gauge (actual size)

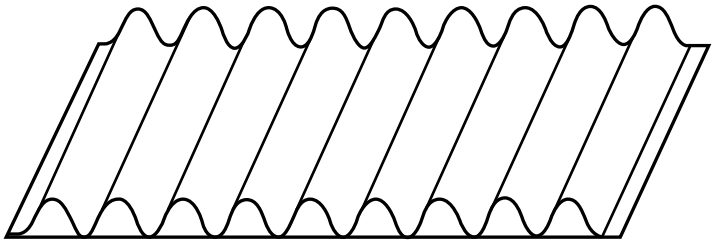
Simplified schematic of a corrugator. The corrugating medium is preconditioned and shaped by the corrugating rolls. The preheated linerboard is then glued to the face of the corrugated paper and conveyed to the double facer for attachment of the liner on the opposite side. The assembly is then dried over hot plates and run through pressure rolls for stability. Once the medium has passed through the cooling section, it is cut to the required size at the delivery section.



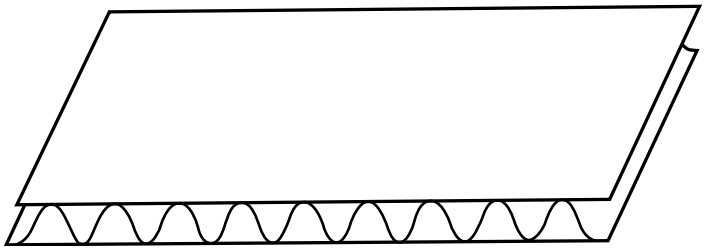
A = Linerboard
B = Corrugating Medium
C = Preheaters
D = Preconditioner
E = Corrugating Rolls
F = Glue



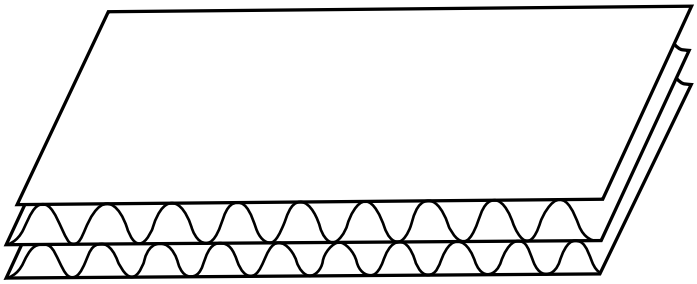
Unlined Corrugated (A-flute)



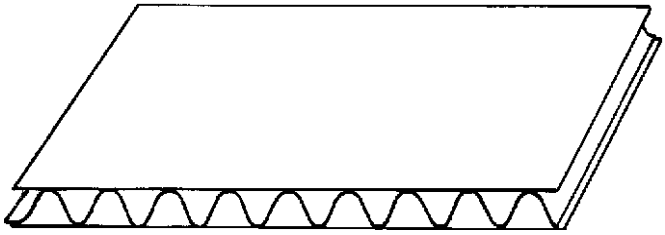
Single Face Corrugated (A-flute)



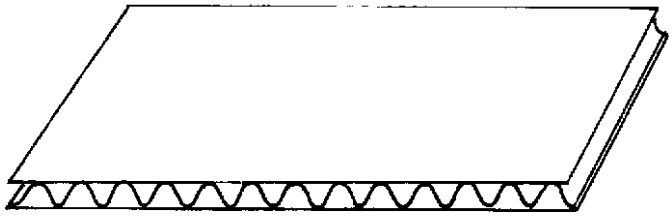
Single Wall (Double Face) Corrugated (A-flute)



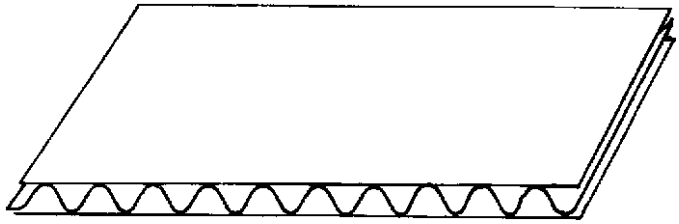
Double Wall (A- and C-flute)



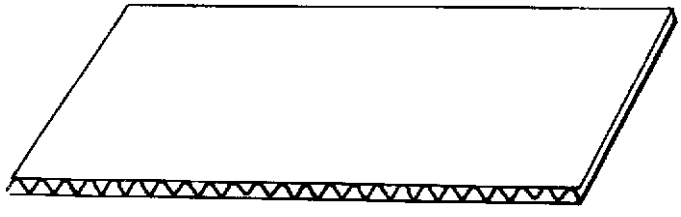
A-flute corrugated—33 flutes per linear foot. Approximately 3/16" (without thickness of facings).



B-flute corrugated—47 flutes per linear foot. Approximately 3/32" (without thickness of facings).



C-flute corrugated—39 flutes per linear foot. Approximately 5/64" (without thickness of facings).



E-flute corrugated—90 flutes per linear foot. Approximately 3/64" (without thickness of facings).

A number of flute structures are available, depending on packaging specifications. *A-flute* has great capacity to absorb shocks owing to the wider spacing of the flutes. *B-flute,* because of the larger number of flutes per foot, provides maximum crush resistance. *C-flute* combines the properties of the first two types, and *E-flute is* used where very thin corrugated board is recommended. In addition, a new grade of corrugated board has recently been developed that has a series of uniquely formed grooves and ridges that are smaller than those in the E-flute and that has 15–20% more ridges per lineal foot than the E-flute.

So universal is the use of corrugated board that its production is viewed as a barometer of the economy as a whole. It is hard to imagine products that cannot be packaged and shipped in corrugated boxes. Today more than 1,160 products—including live fish!—are shipped in corrugated boxes.

Corrugated board is used in multicolored shippers and point-of-purchase displays. It is among the least expensive of all packaging materials.

DESIGNING A CORRUGATED BOX

The design of a corrugated box is a major undertaking. The process of selecting the correct package design for a particular product has grown more complex as new technologies and materials present ever-increasing manufacturing options.

The ways in which corrugated board may be used are practically limitless. Certain basic container styles and designs are suitable for packaging a wide range of products. There are some corrugated interior devices (platforms, padding, or inserts) and plastics (molded polystyrene foam) used to provide reinforcement, bracing, and shock absorption. These are illustrated and described on pages 541-578.

Specialty containers are tailored to the requirements of a particular product. Those requirements may involve everything from the "shipability" of the product itself to how the container is filled, stored, loaded, stacked, braced, chopped, and unpacked. Specialty or custom-made boxes are usually required for special products in large quantities (10,000 or more). Master cartons, which are shipping cartons that hold smaller cartons, are used for food, detergents, housewares, and hardwares.

Government and industry standards and regulations are designed to protect the users of cartons. There are laws pertaining to method of shipment, such as rail, air freight, truck, and parcel post (U.S. Postal Service). In addition, all corrugated materials and cartons must be certified by the manufacturer. Weight, paper content, and puncture and bursting test certificates must be displayed on all corrugated boxes.

A significant trend in corrugated technology is impregnating and coating corrugated board with waxes and plastics. The moisture-resistant coating permits reuse of the carton and shipment of products, such as produce, that were previously shipped in expensive wooded crates and barrels.

Weight, paper contents, and puncture and bursting test certificates must be displayed on all corrugated containers.

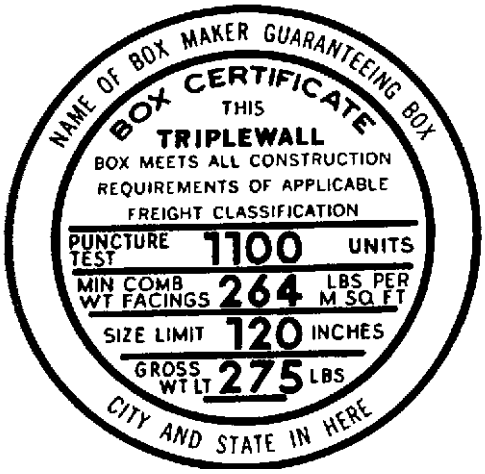
PRINTING ON CORRUGATED BOARD

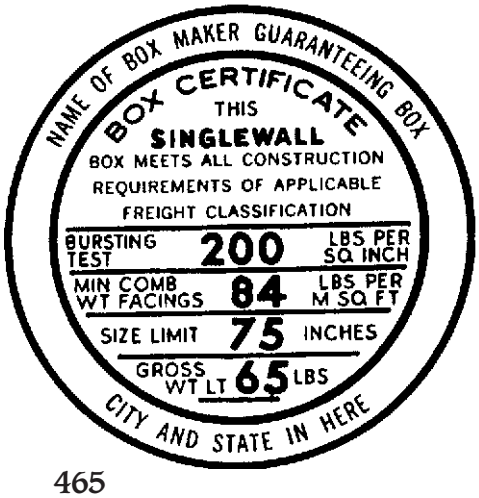
Direct printing on brown corrugated board, which has a highly absorbent surface, is usually limited to the use of line art. This is the least expensive type of printing usable on corrugated board. Letterpress and, more recently, flexography are the typical printing methods.

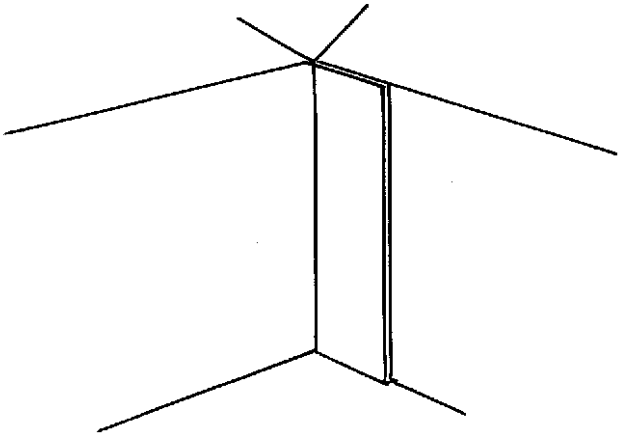
Preprint is a term used to refer to the process in which a roll of printed stock is used as the top liner in making corrugated sheet. Flexography and rotogravure are the printing methods used in most preprint processes. The surface may be kraft, white clay-coated kraft, clay-coated bleached liner, or foil. The set-up costs for preprinting are high.

It is difficult to print full color on most corrugated board, with the exception of E-flute. Therefore, labels are often prepared to cover the boxes on one or more of their sides: full-sized labels cover the top and all four sides of a box; partial labels may be used only on the top of a box or on one or two of its sides. There are several variations of label application, including lamination onto the box, depending on size, shape, and cost considerations.

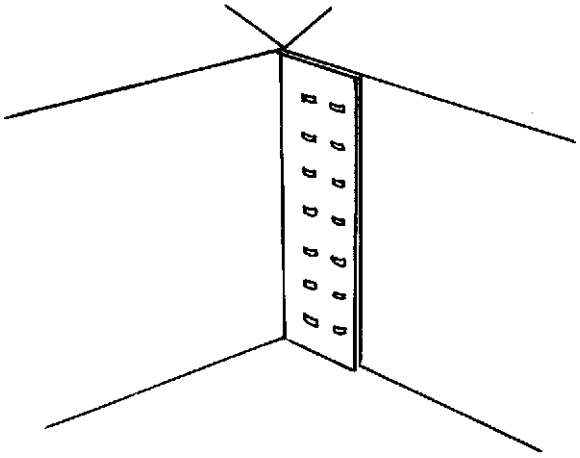
Litho labeling refers to lithographic printing of a sheet of paper that is then adhered (laminated) to corrugated board. Labels can be full or partial. Litho labeling and laminations are used on large boxes for toys, games, housewares, and sporting goods.



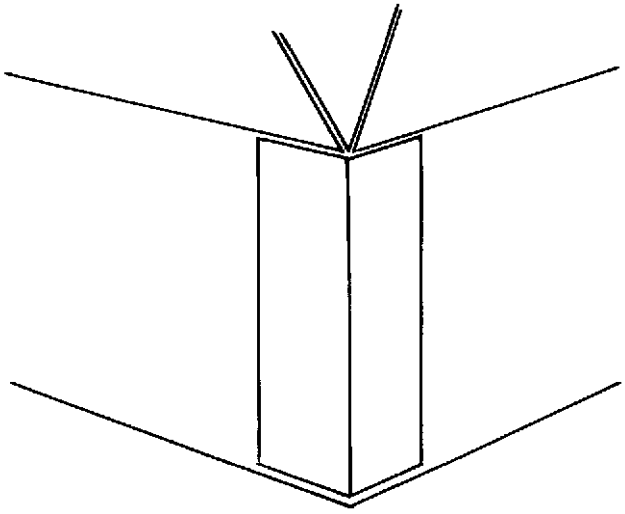




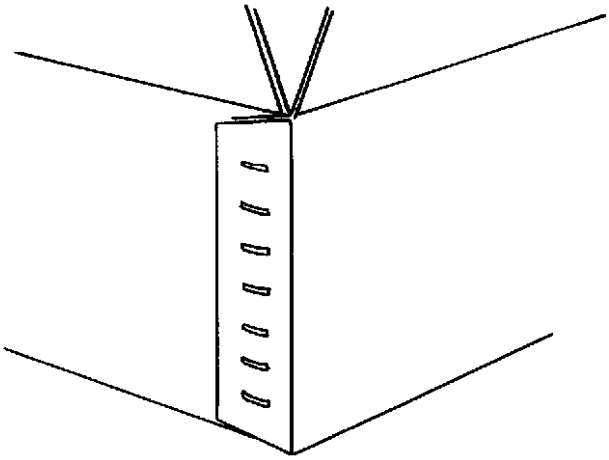
Glued joint: the manufacturer's joint tab is glued to the inside of the box.



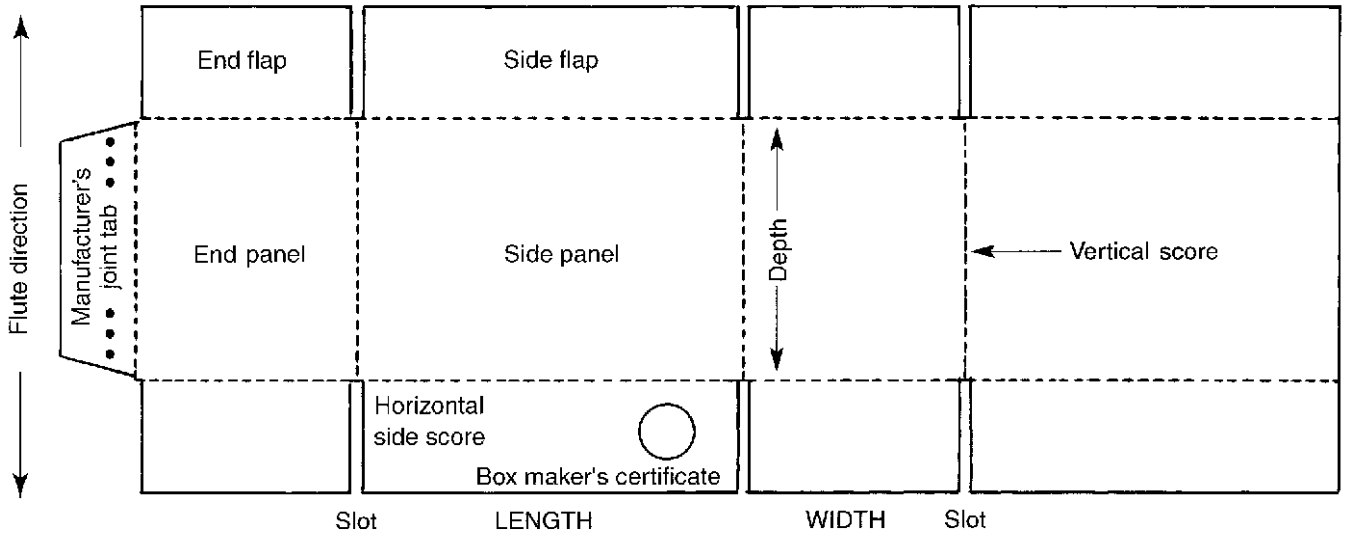
Stitched joint: the lap is stapled to the outside of the box.

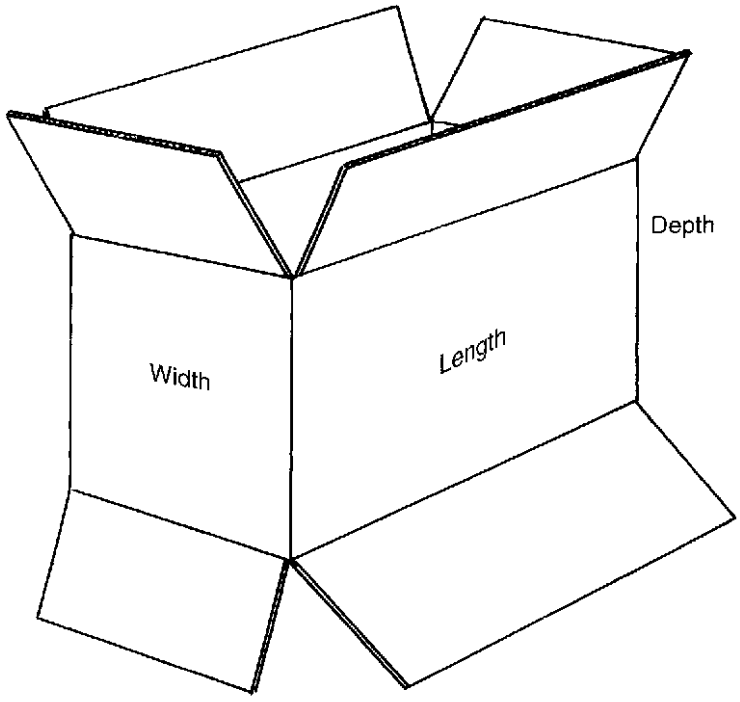


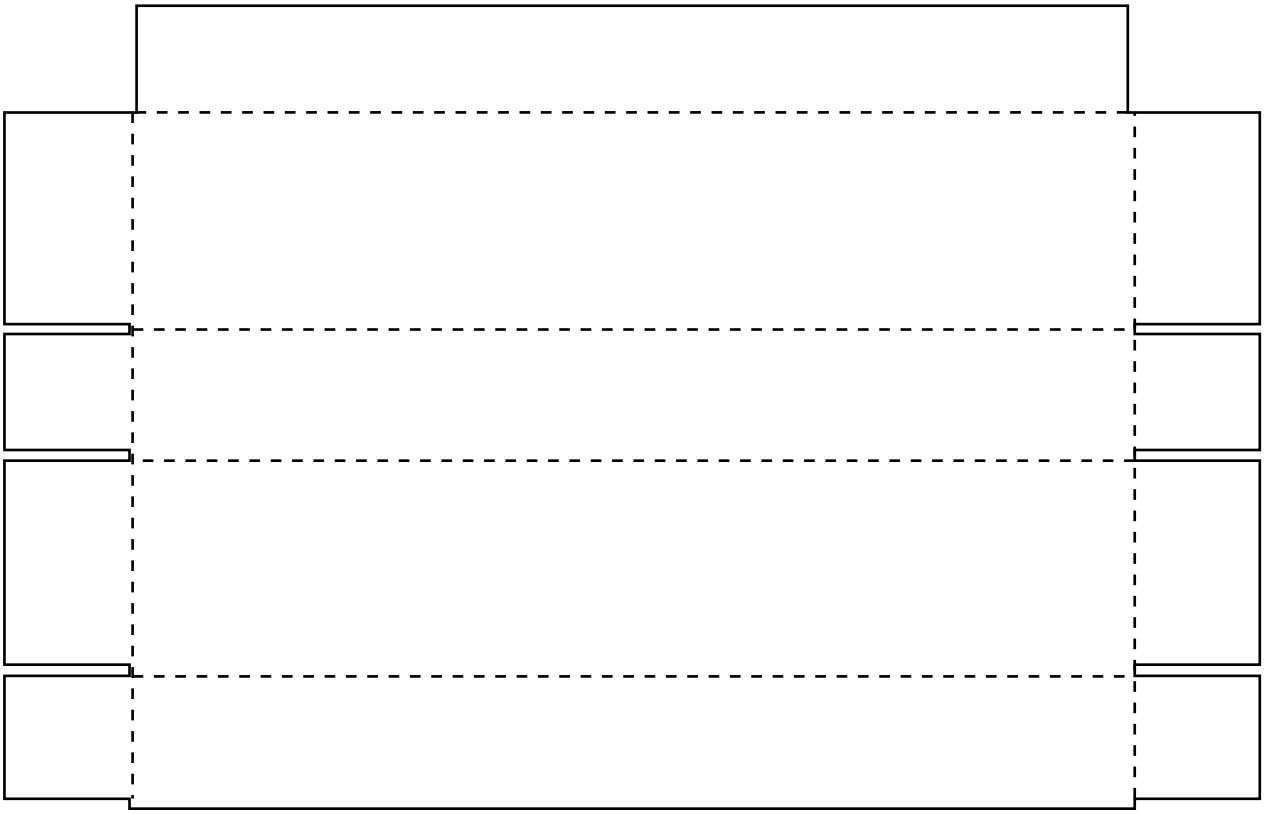
Taped joint: the side and end panels are taped from the outside of the box. No manufacturer's joint tab is needed.

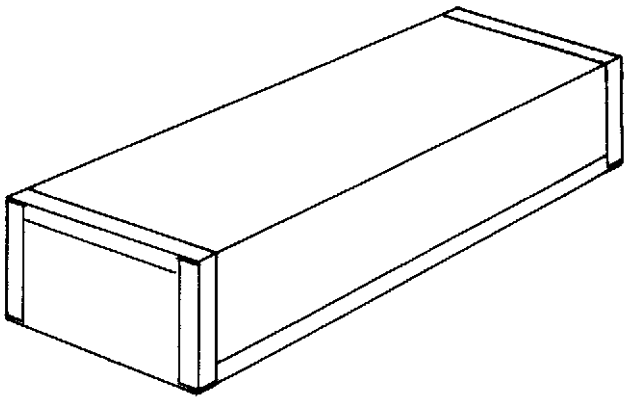


Stitched joint: the lap is stapled to the inside of the box.

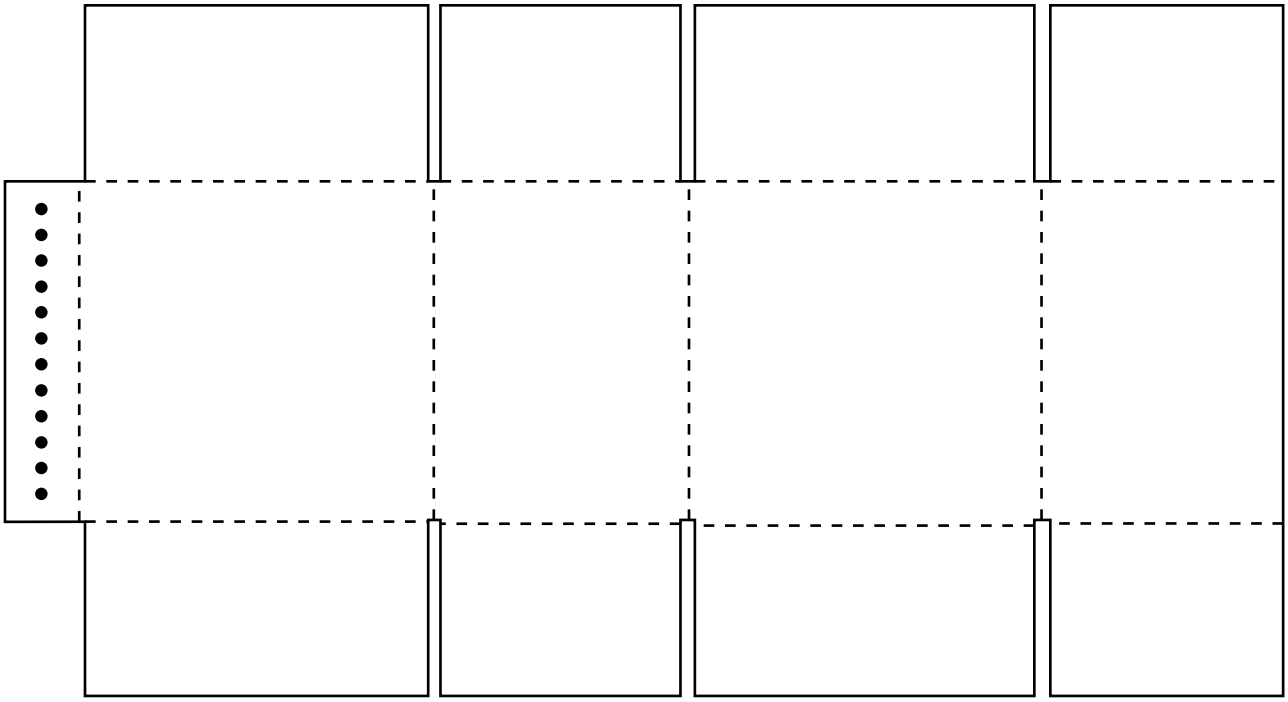

End flap
Side flap
Flute direction
Manufacturer's joint tab
End panel
Side panel
Depth
Vertical score
Horizontal side score
Box maker's certificate
Slot
LENGTH
WIDTH
Slot

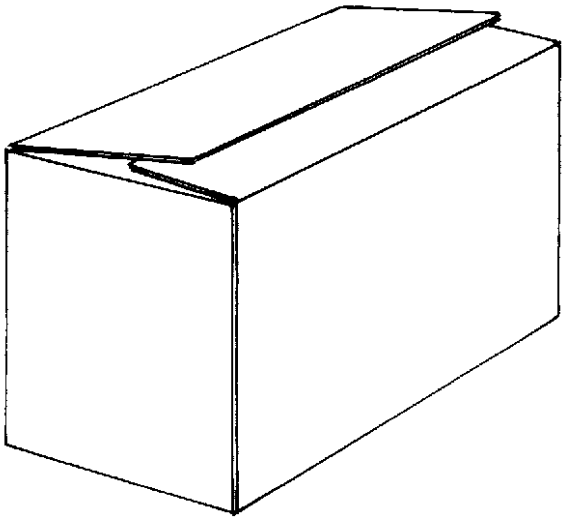

Depth
Width
Length



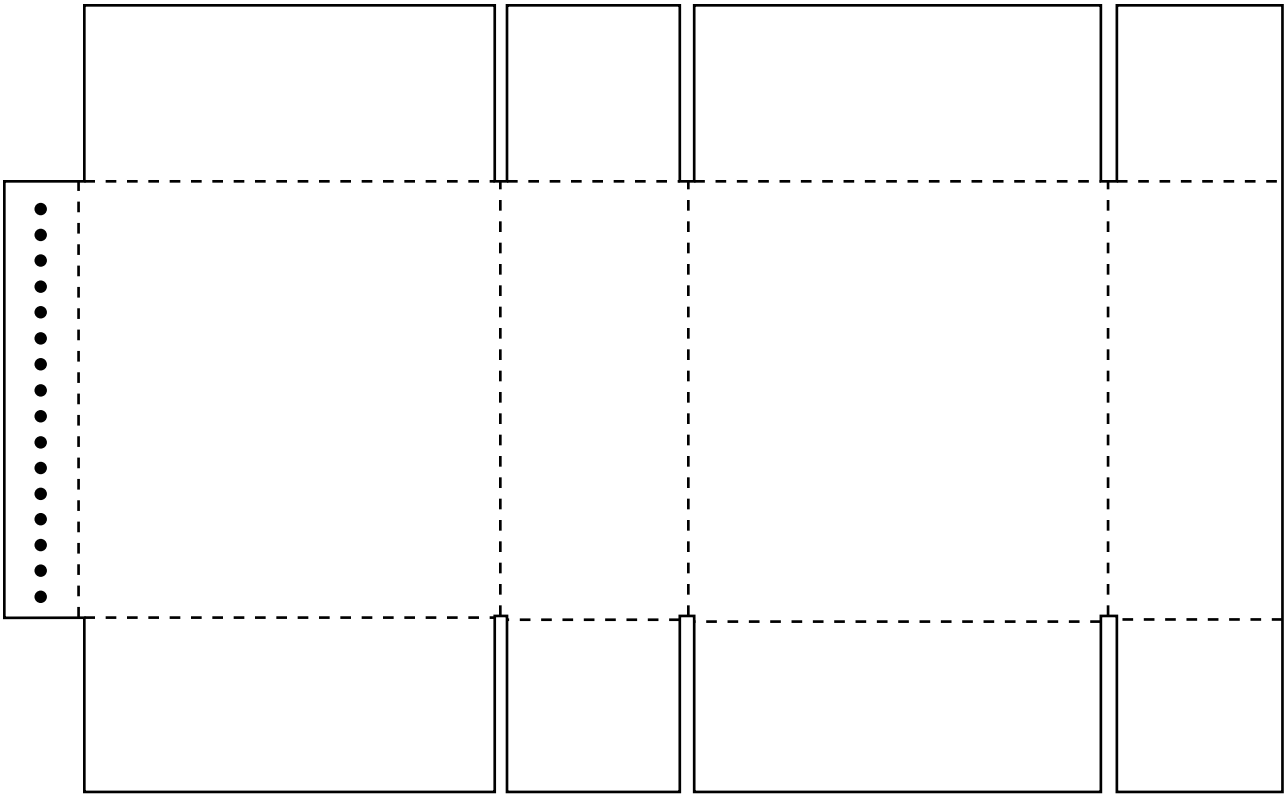


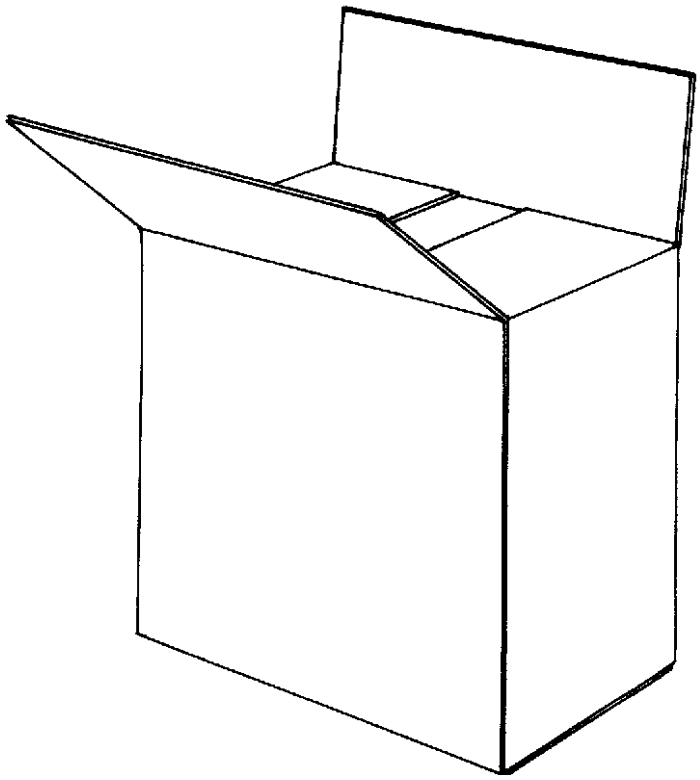
OVERLAP SLOTTED CONTAINER
(Intl. Box Code 0202)

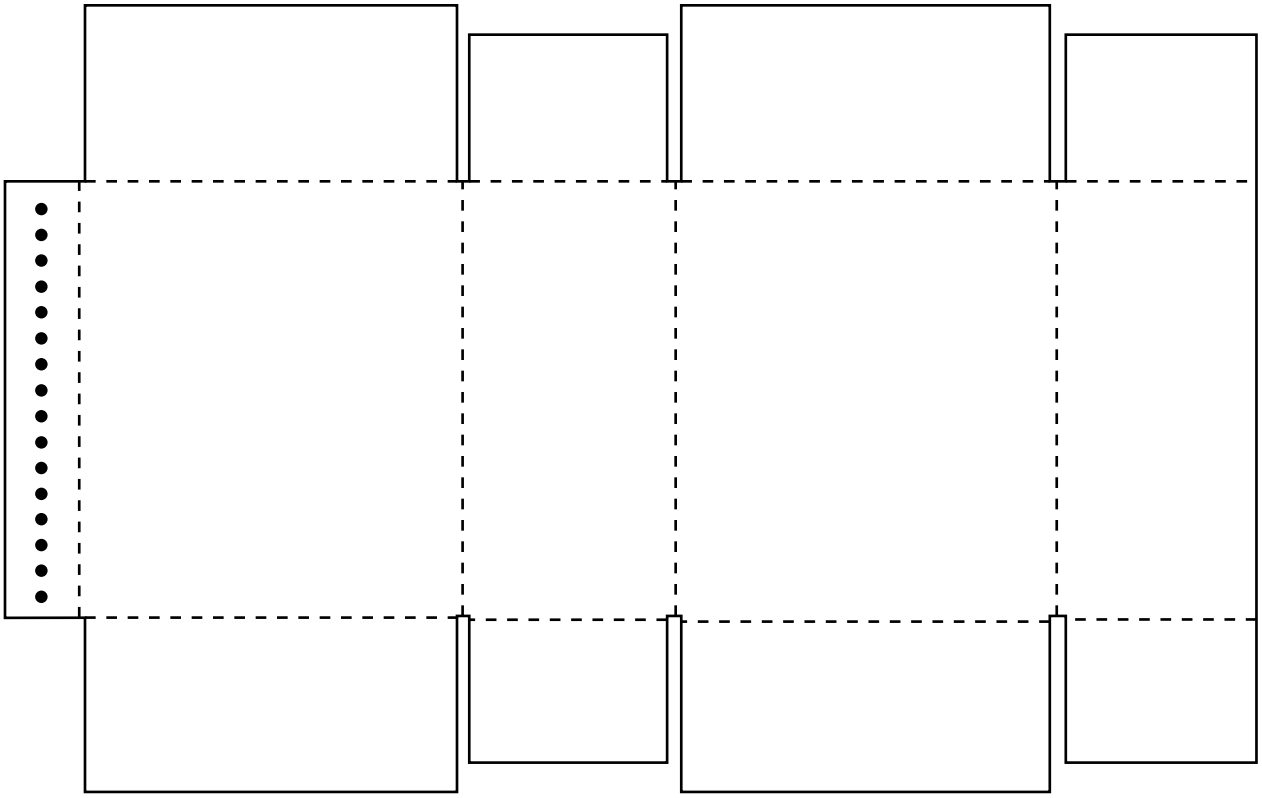


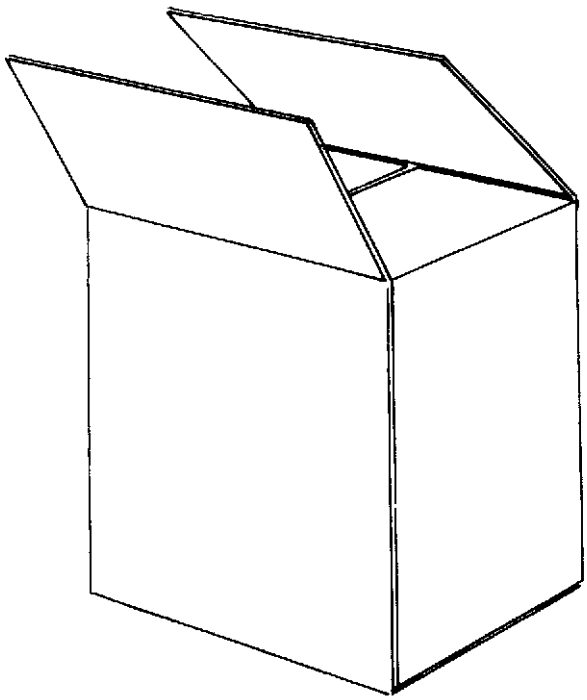


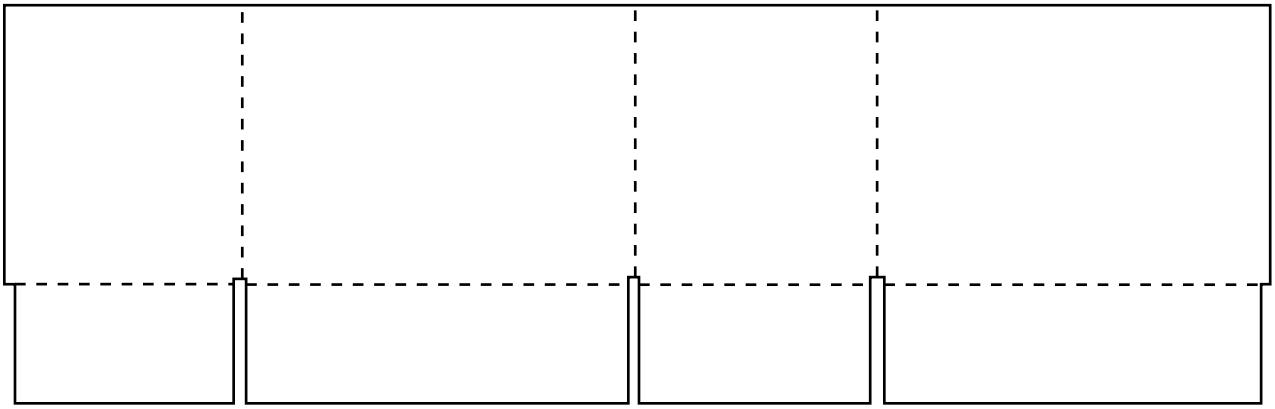
FULL OVERLAP SLOTTED CONTAINER
(Intl. Box Code 0203)

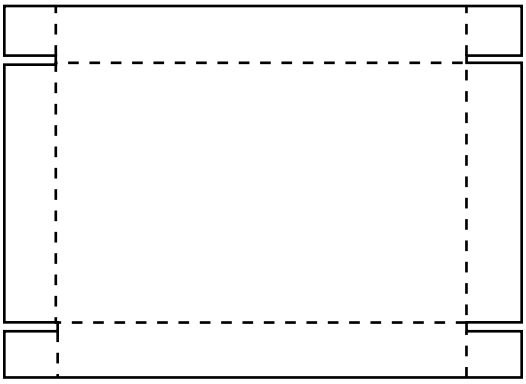


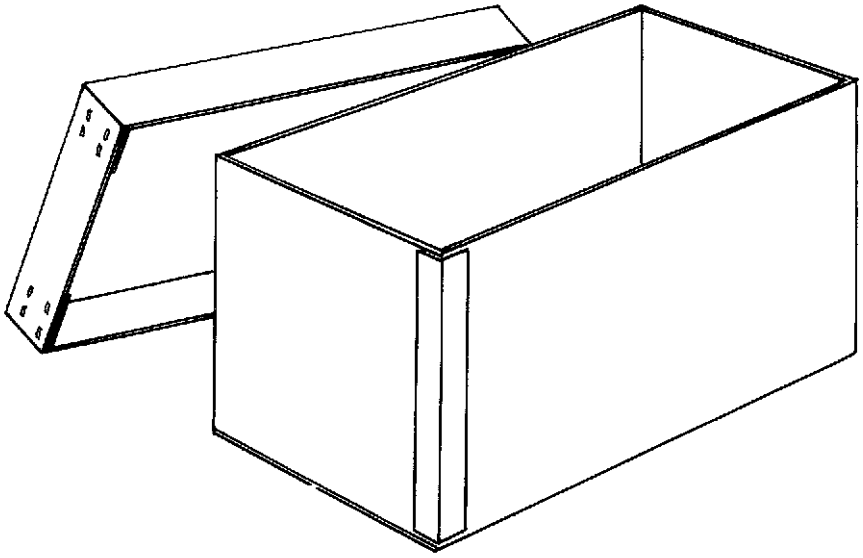


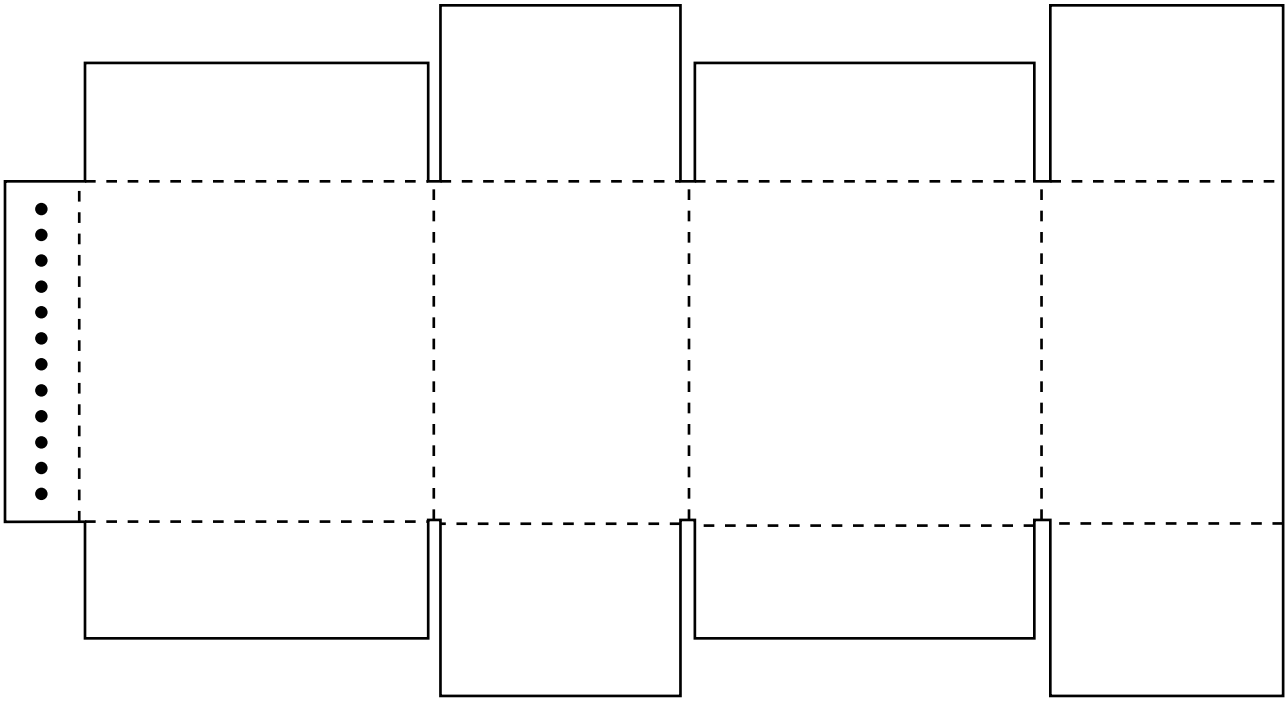


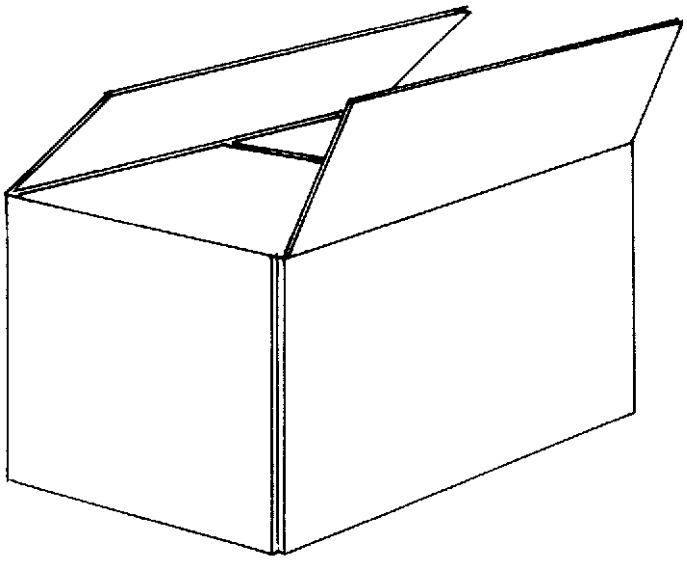


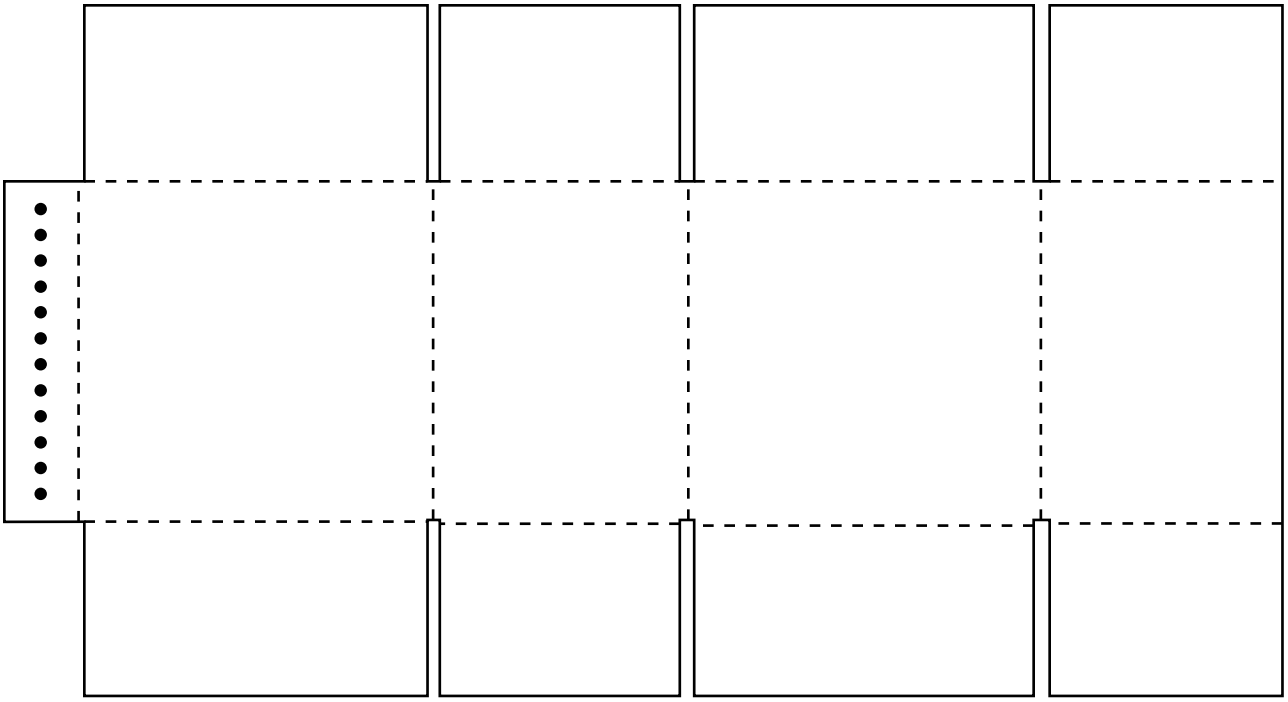


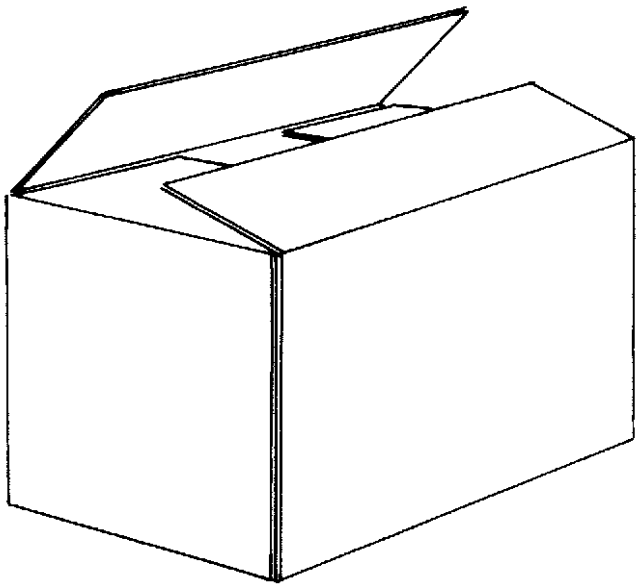


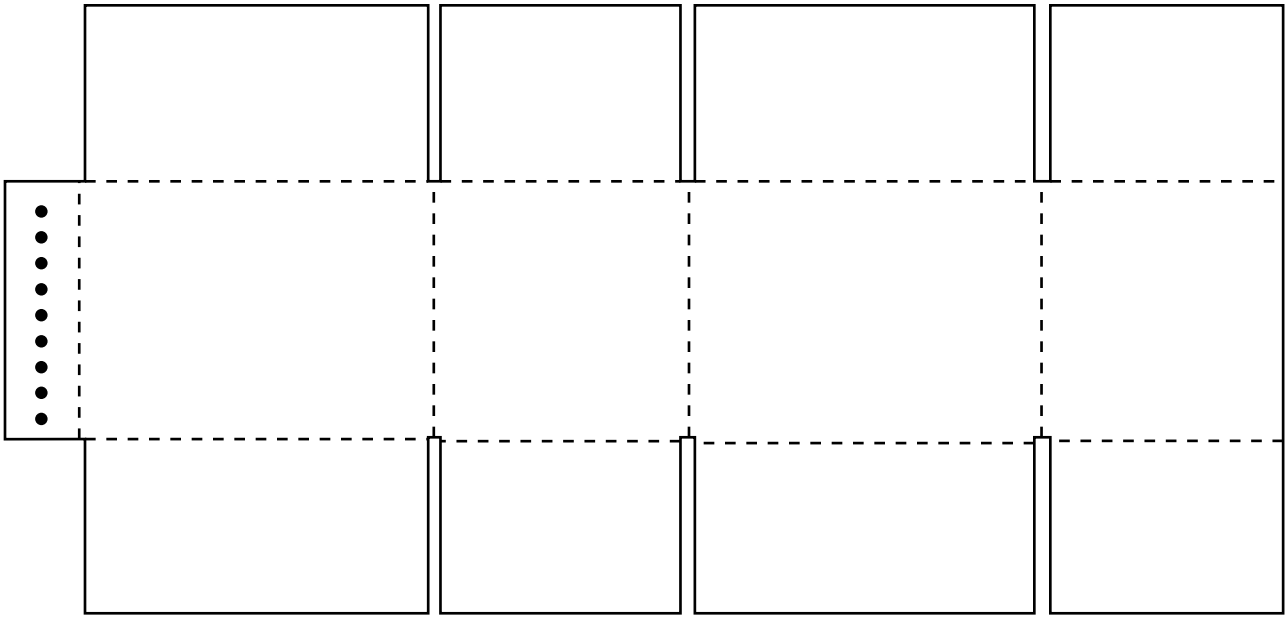


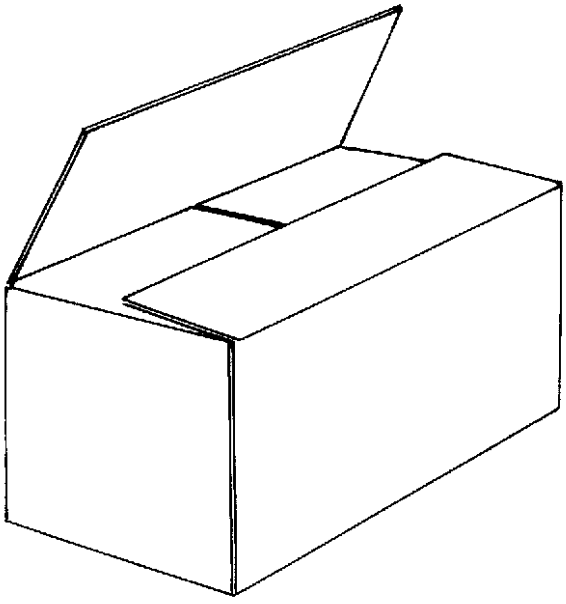


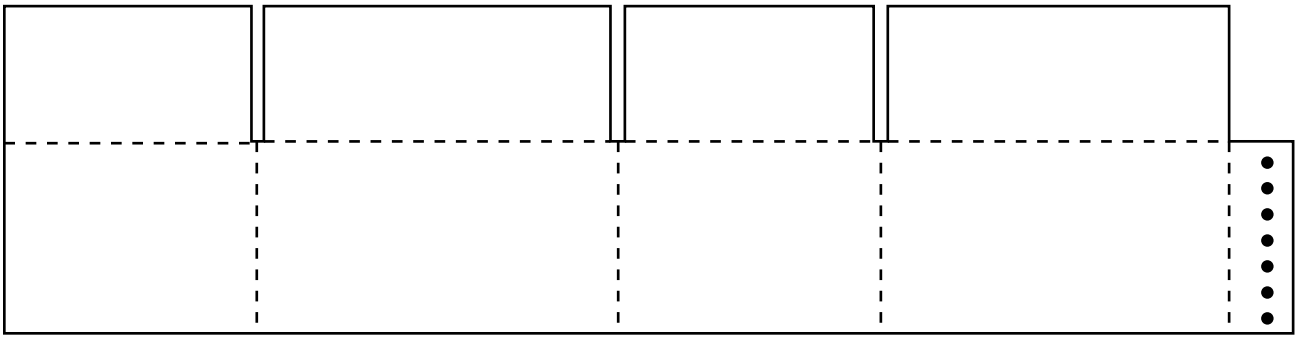


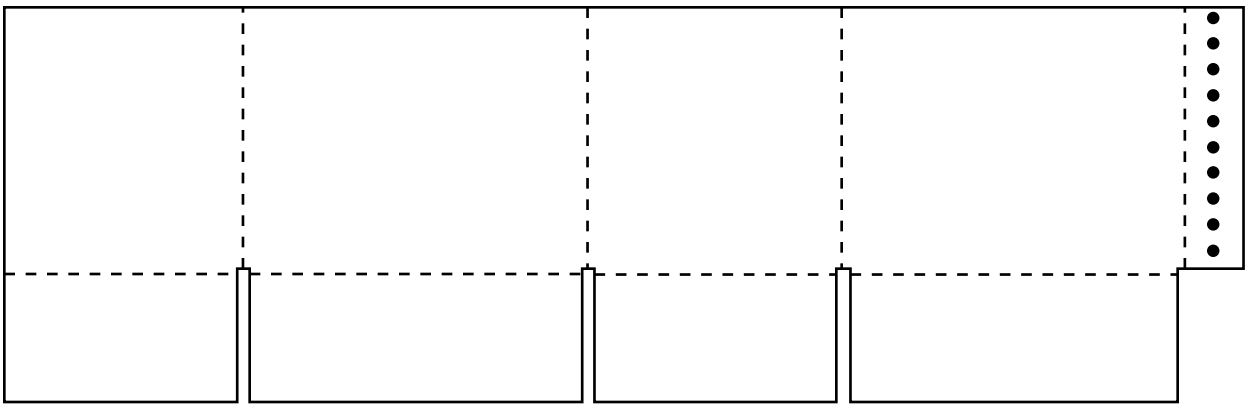


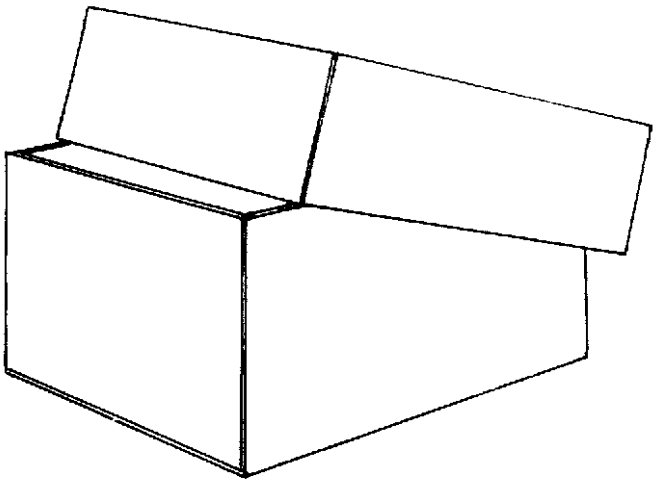




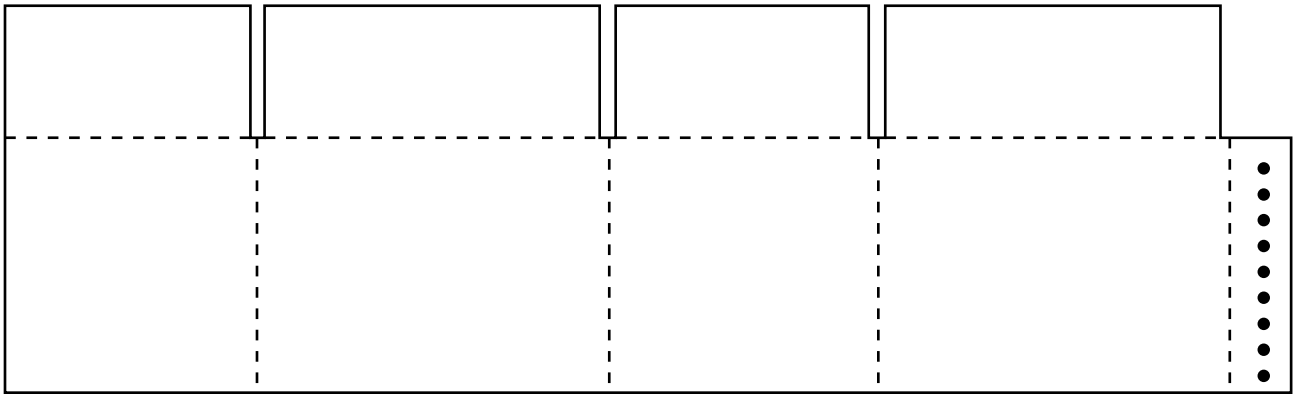


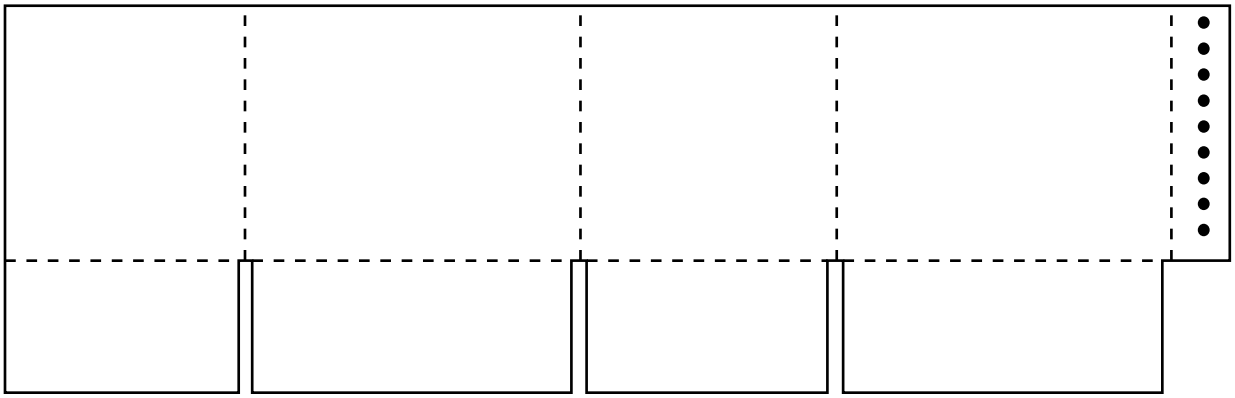


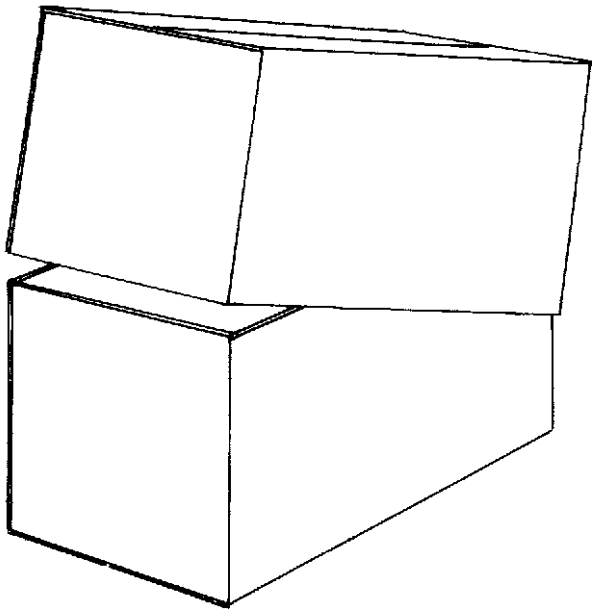


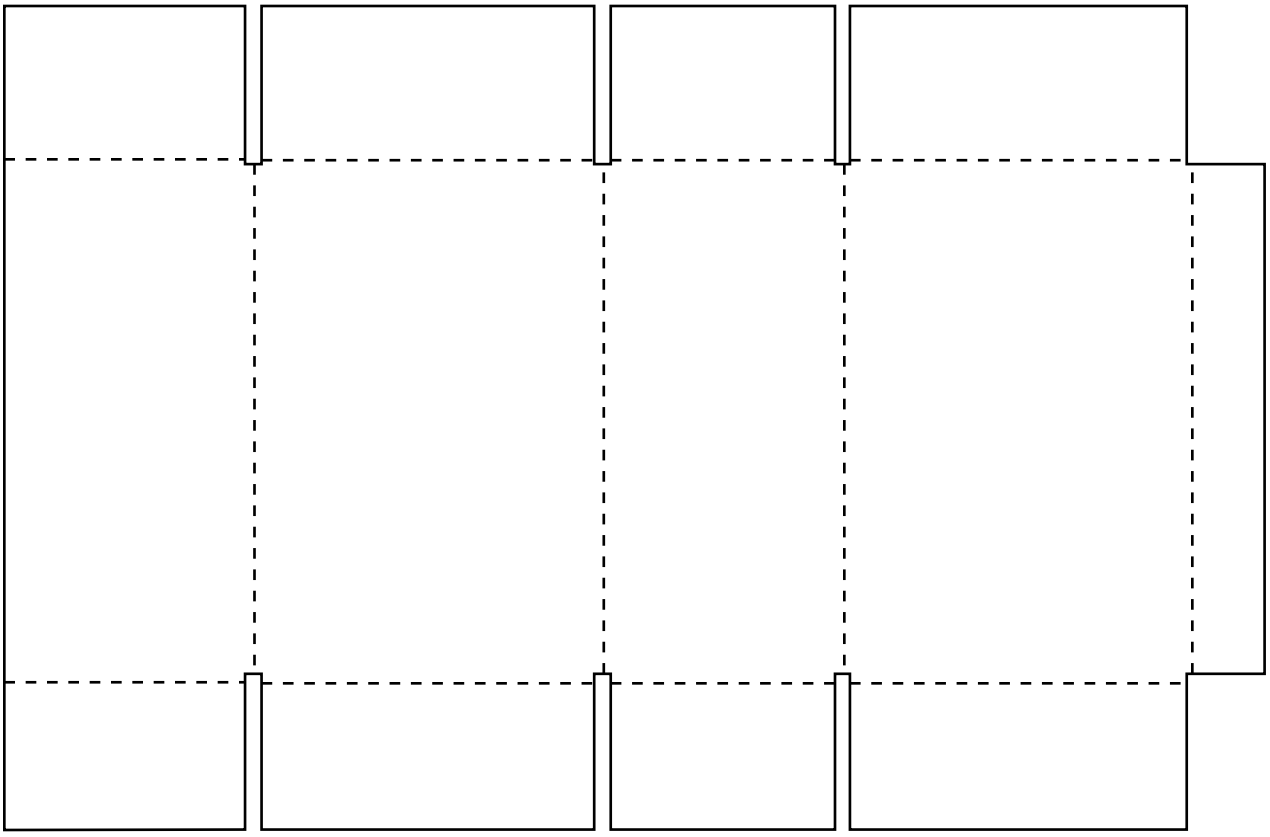


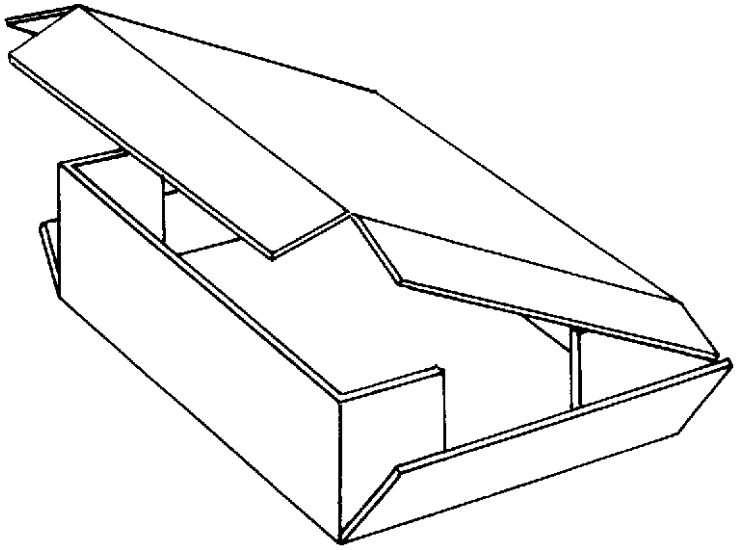
FULL TELESCOPE HALF-SLOTTED CONTAINER
(Intl. Box Code 0320)

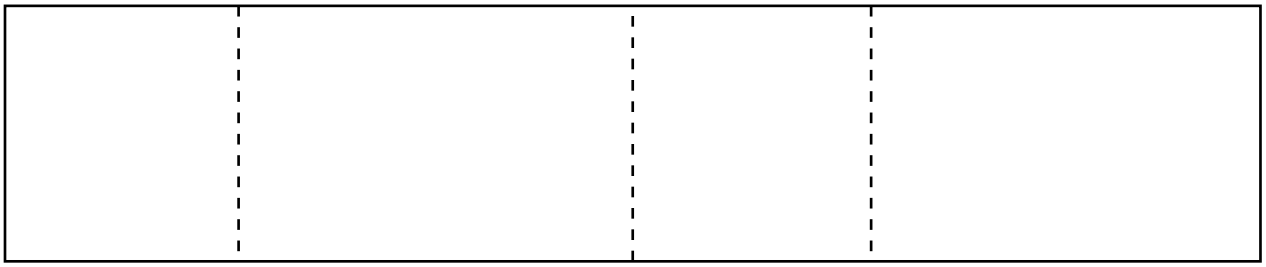


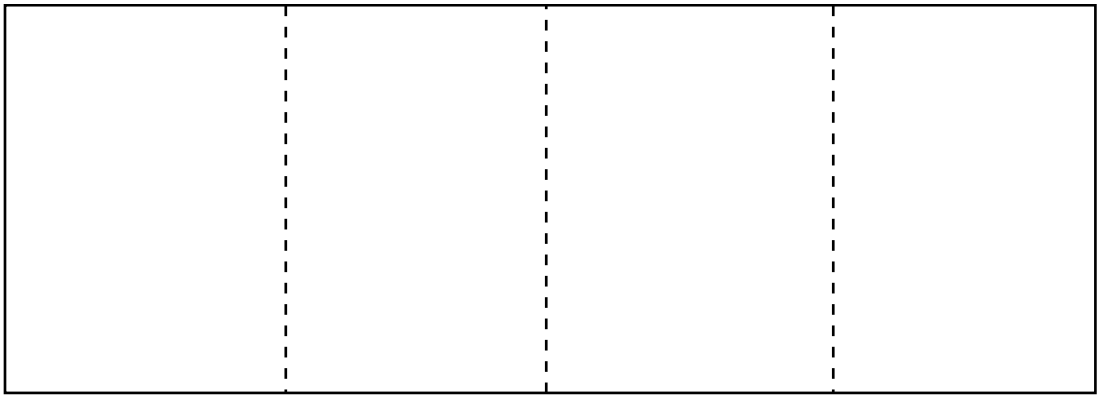


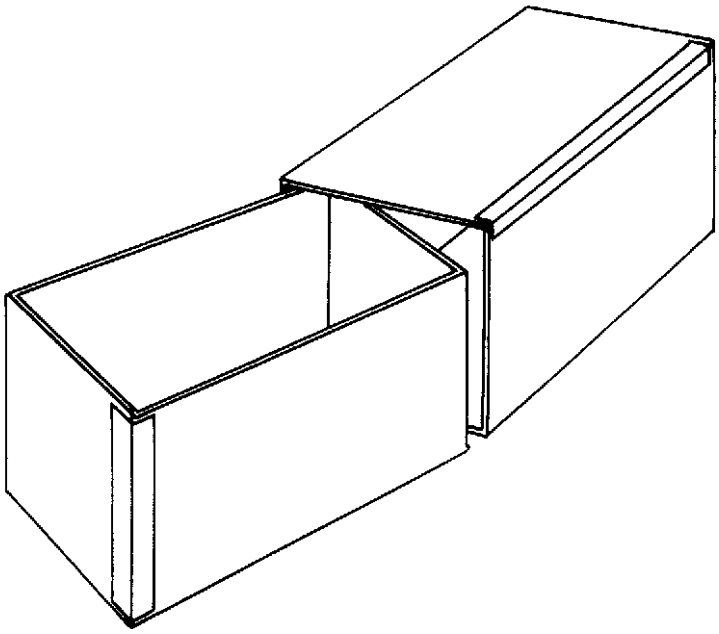


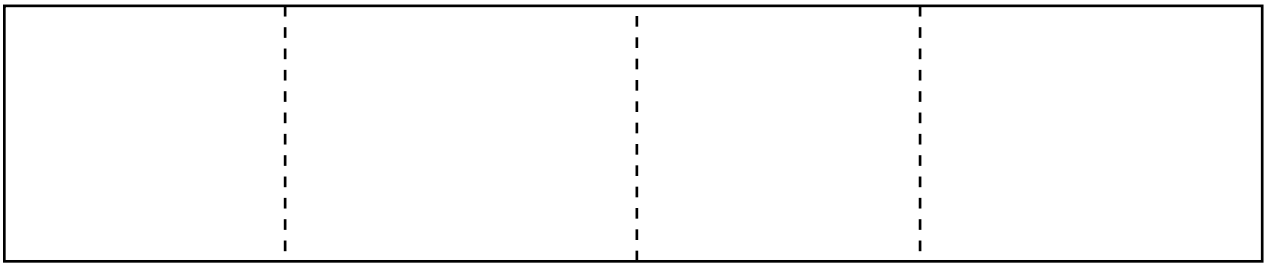


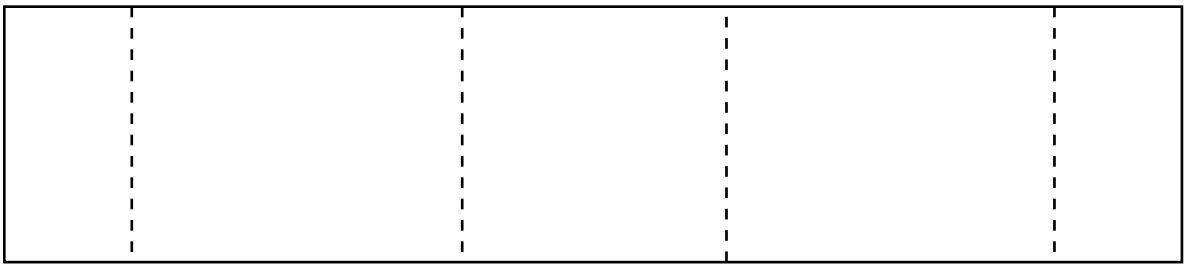


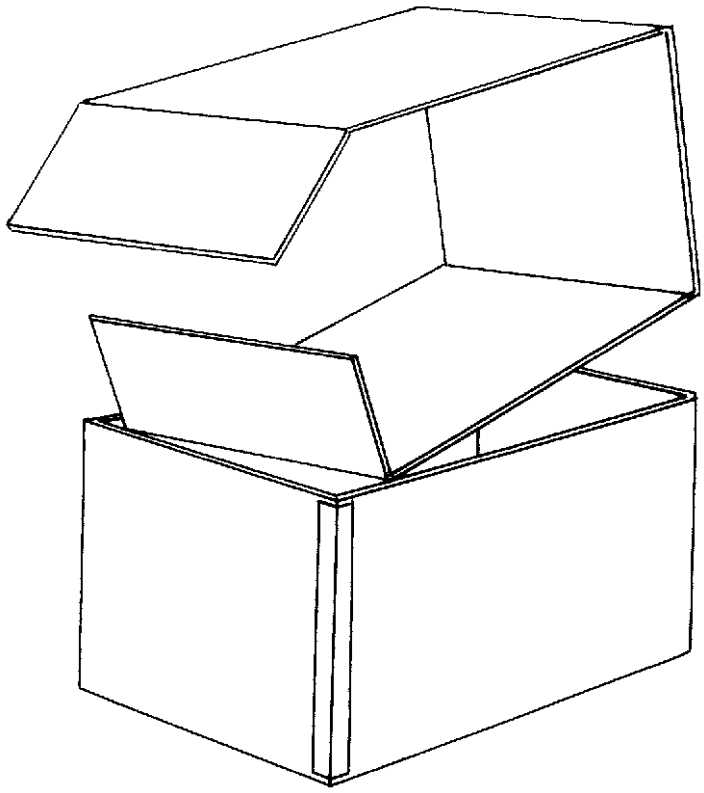


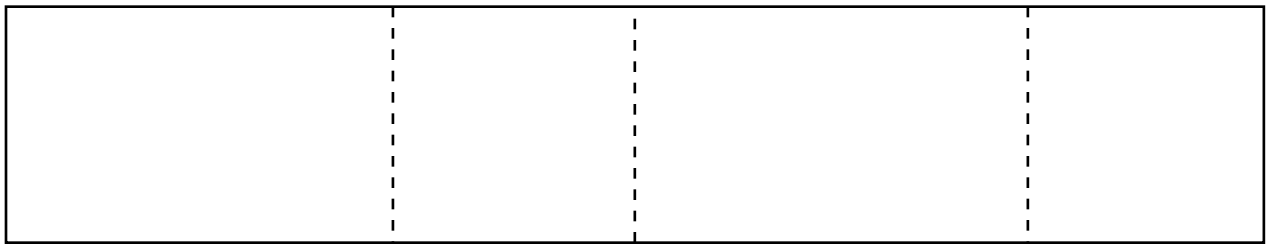


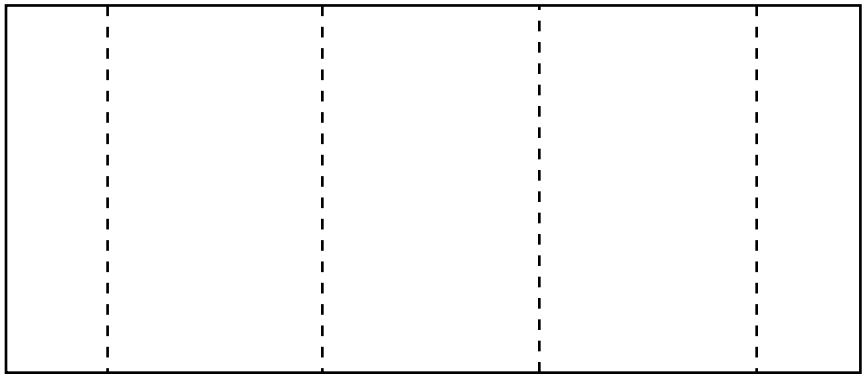


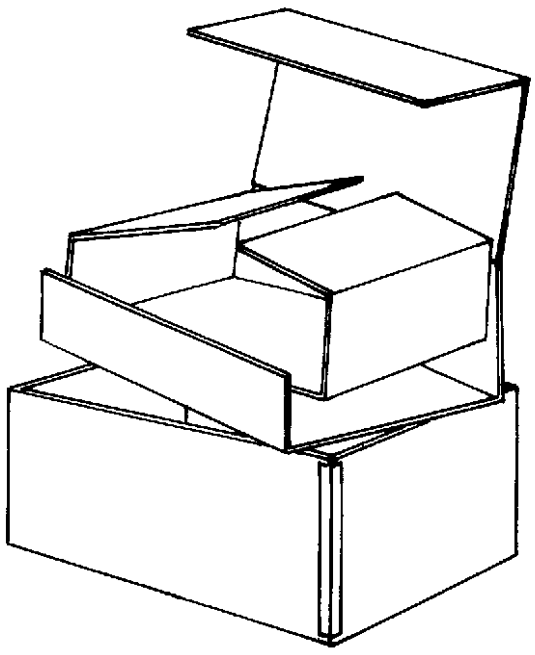


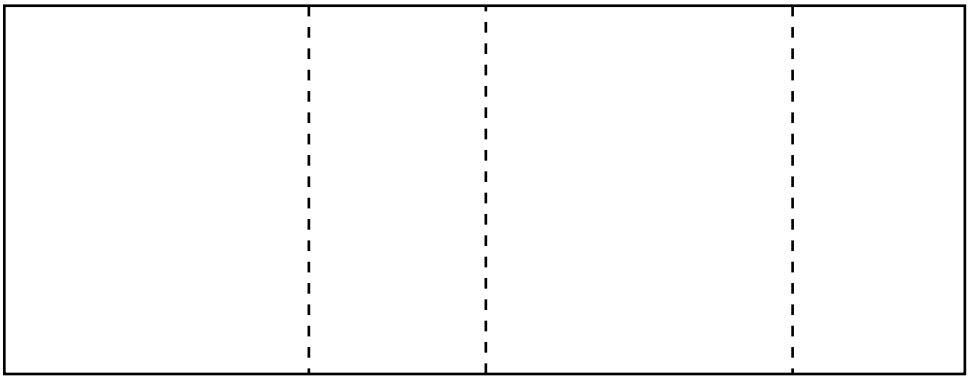


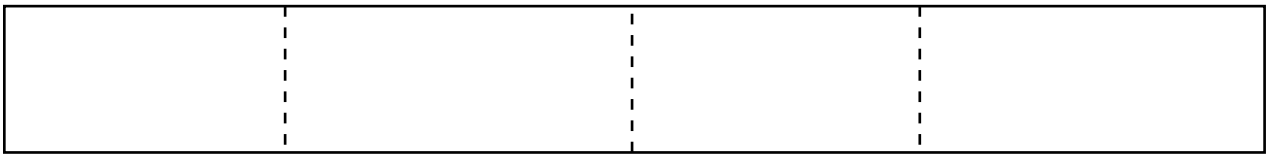


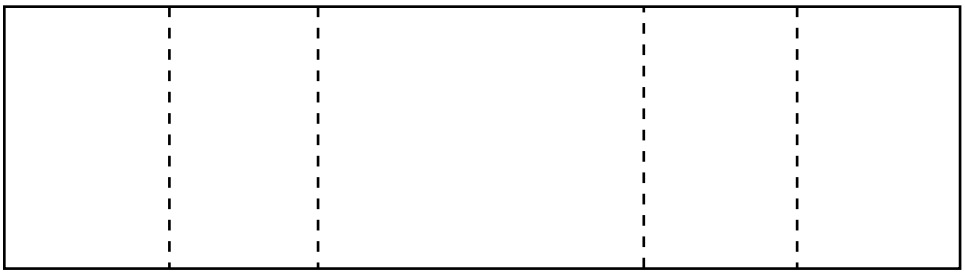


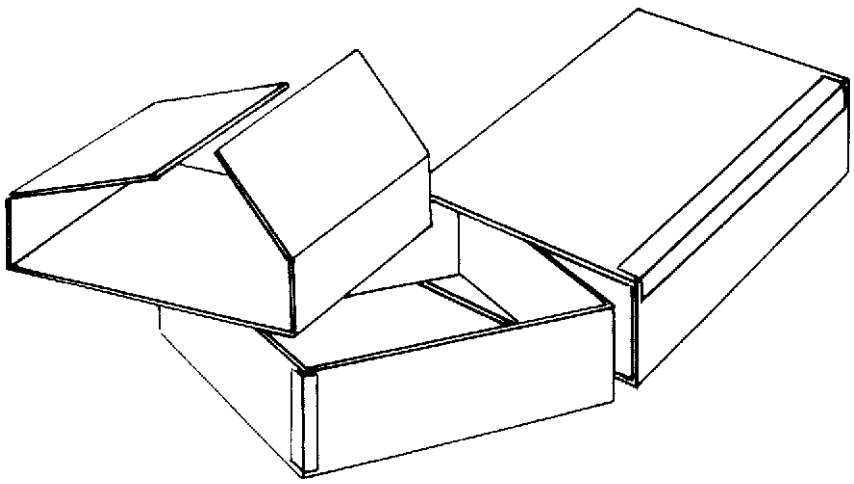




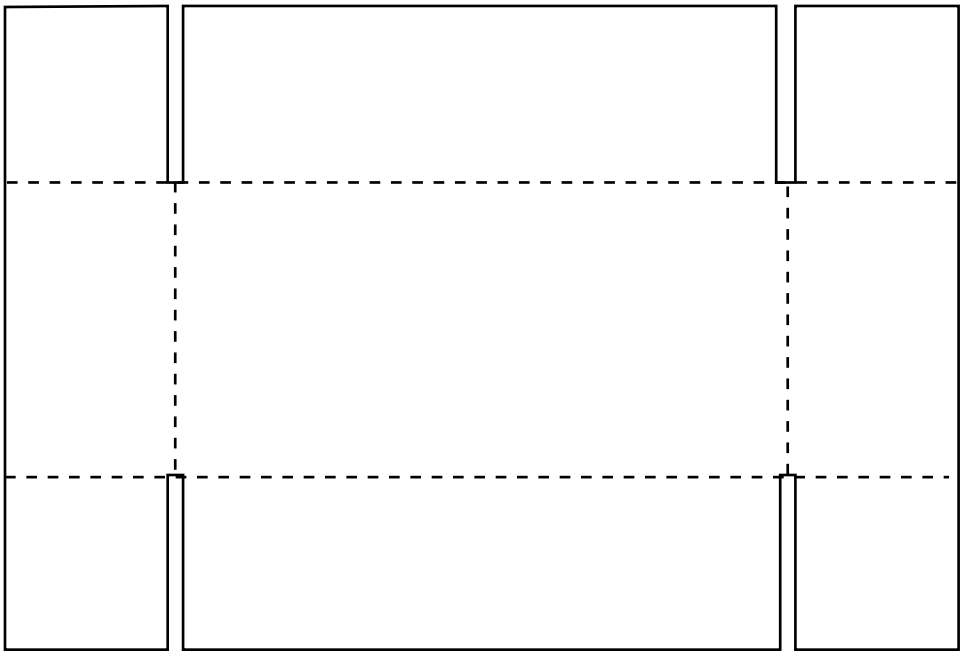


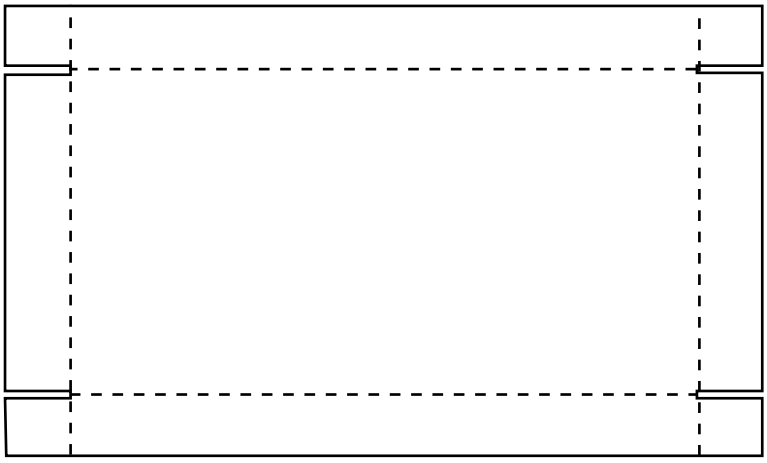


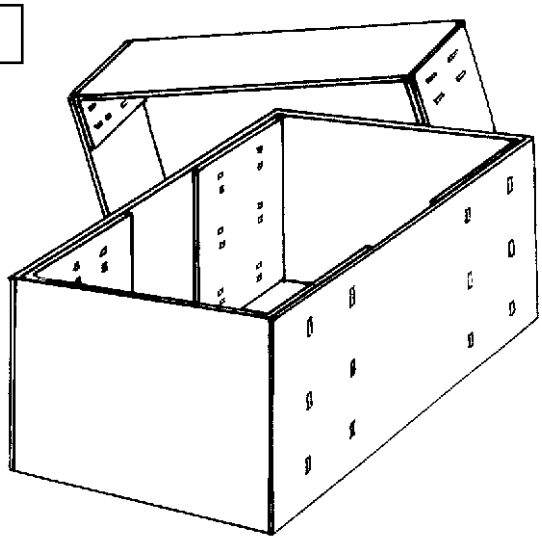


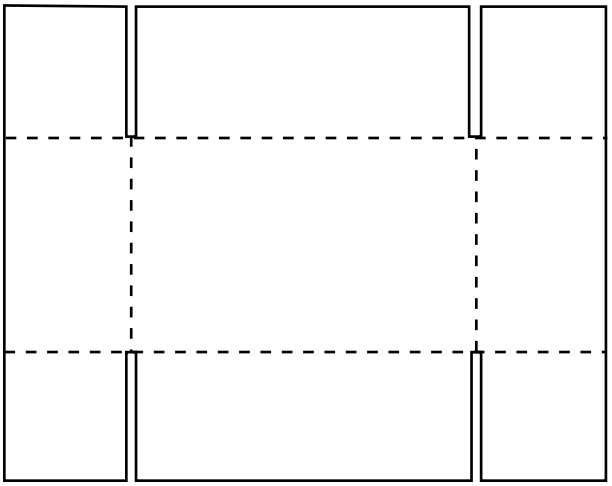


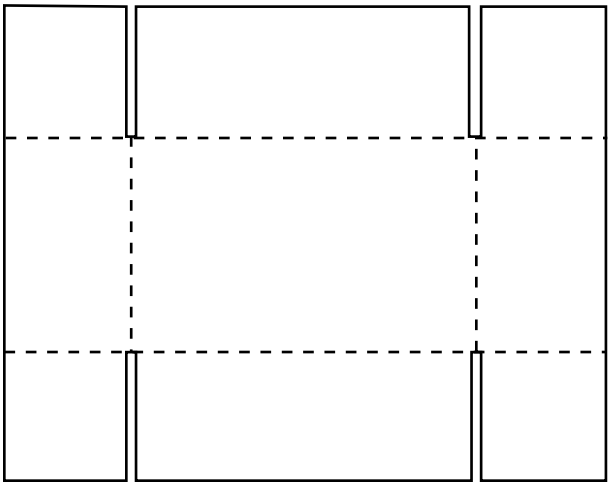
DESIGN STYLE WITH COVER
(Intl. Box Code 0306)

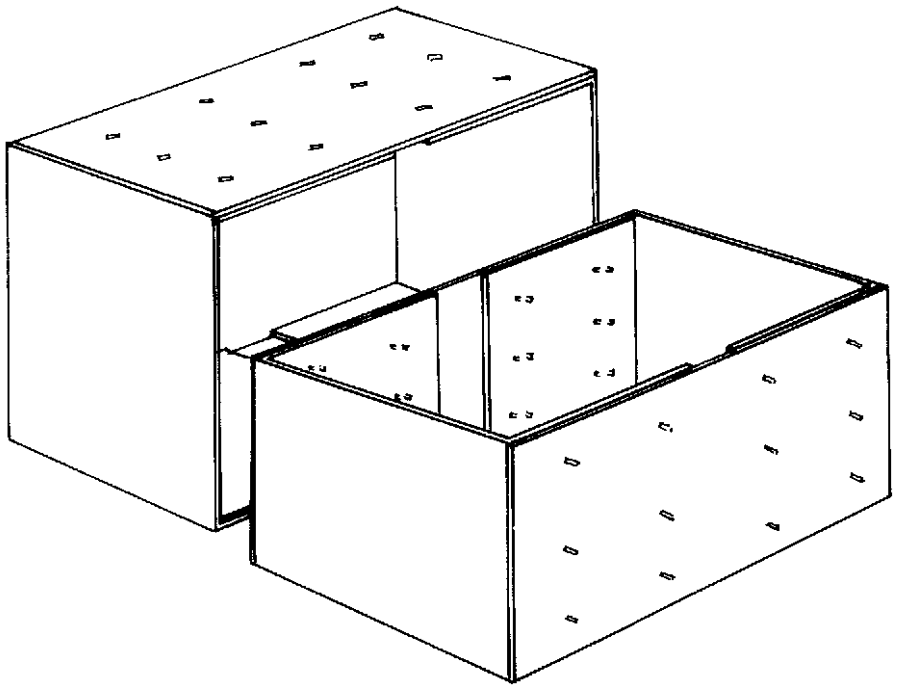




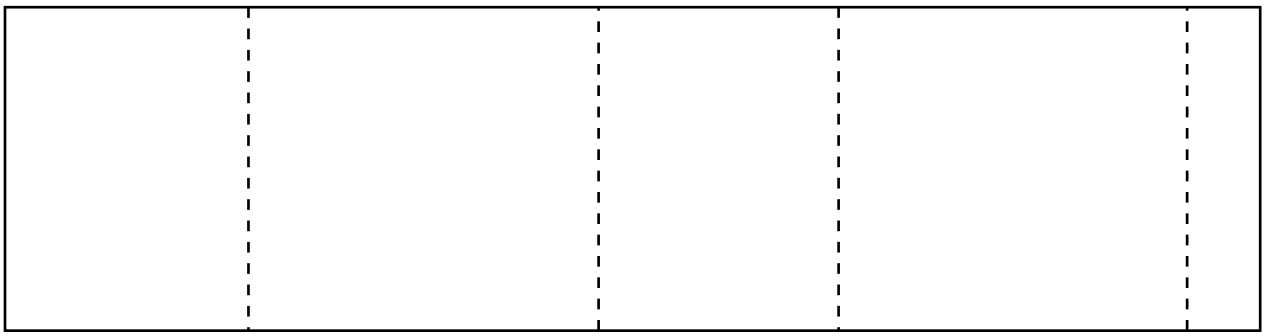


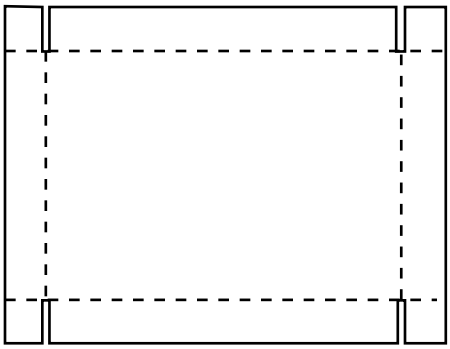


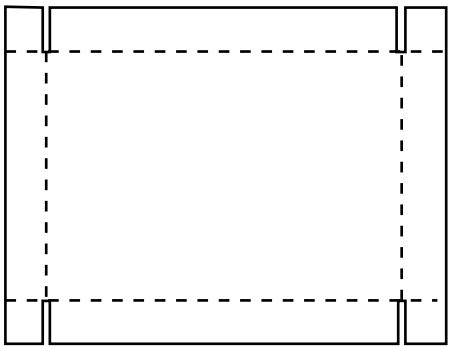


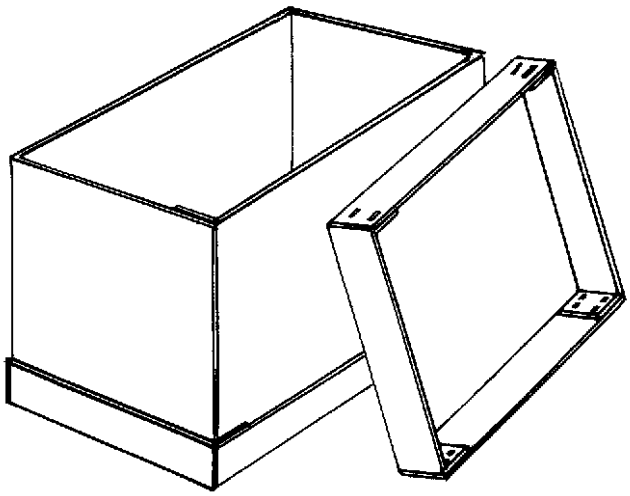


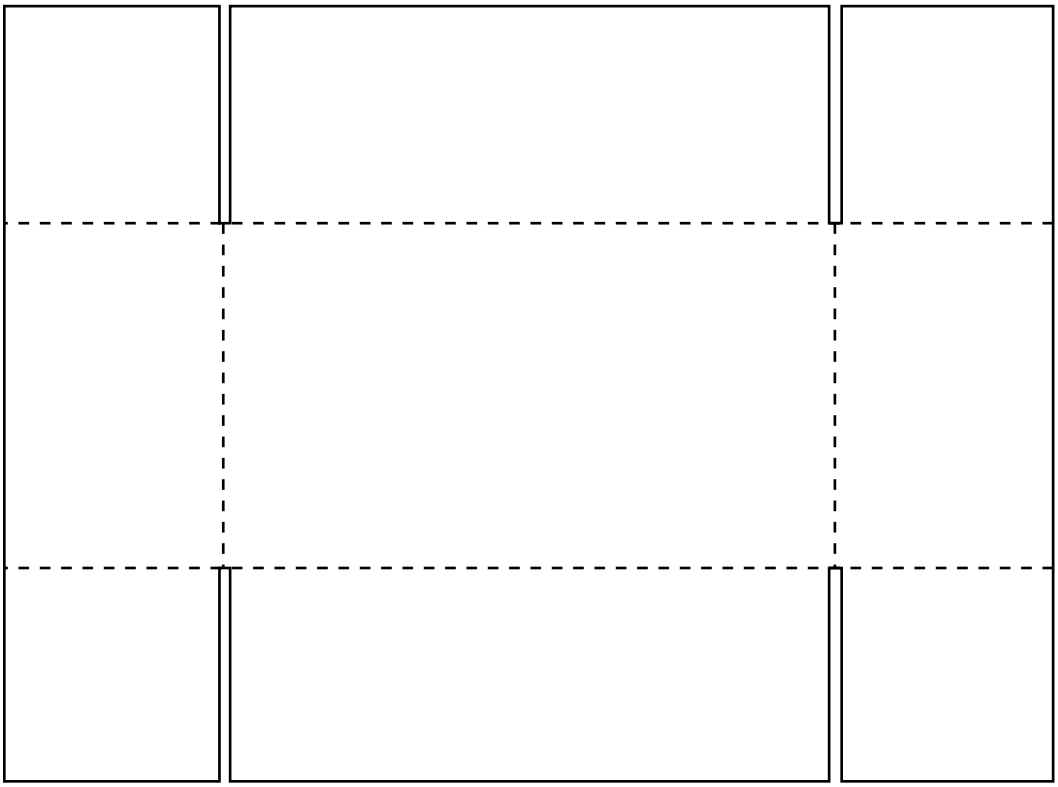
DOUBLE COVER BOX
(Intl. Box Code 0310)

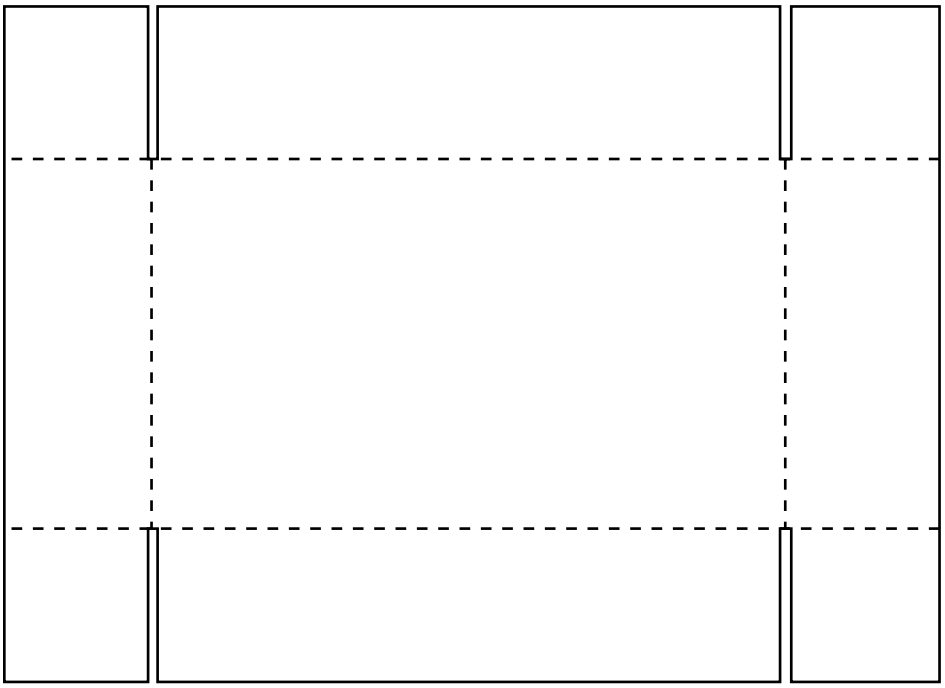


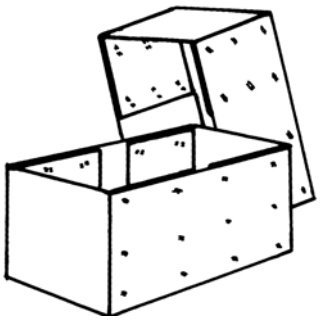




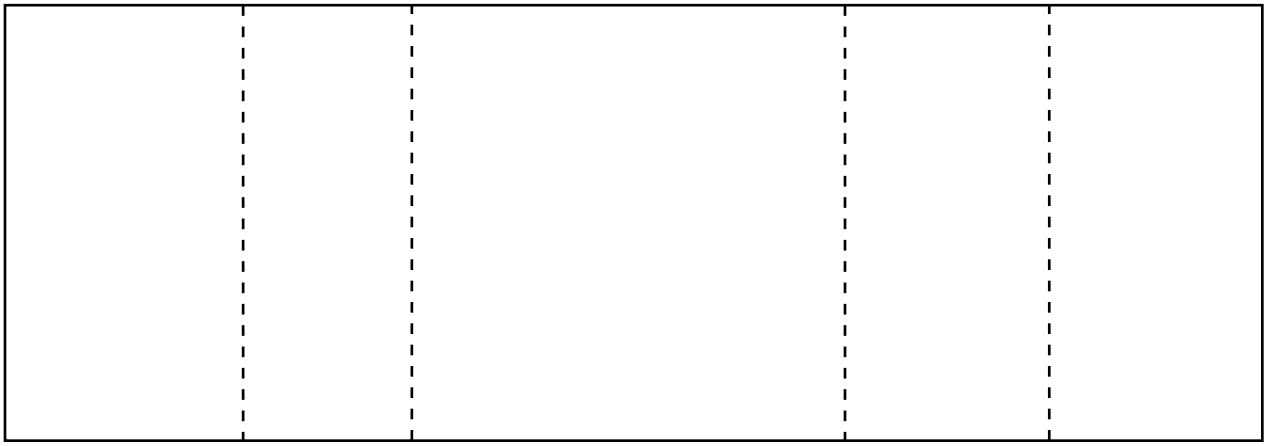


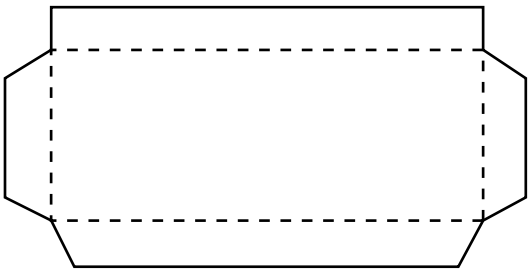


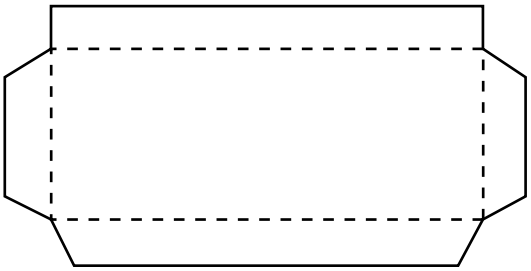


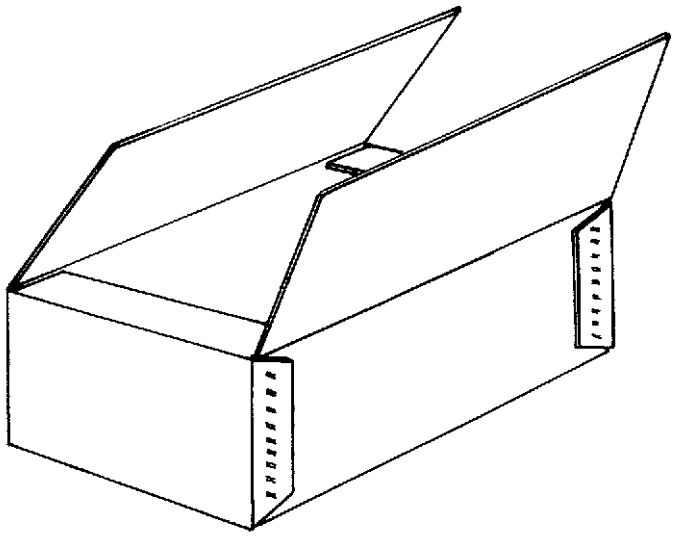


#2 BLISS BOX
(Intl. Box Code 0605)

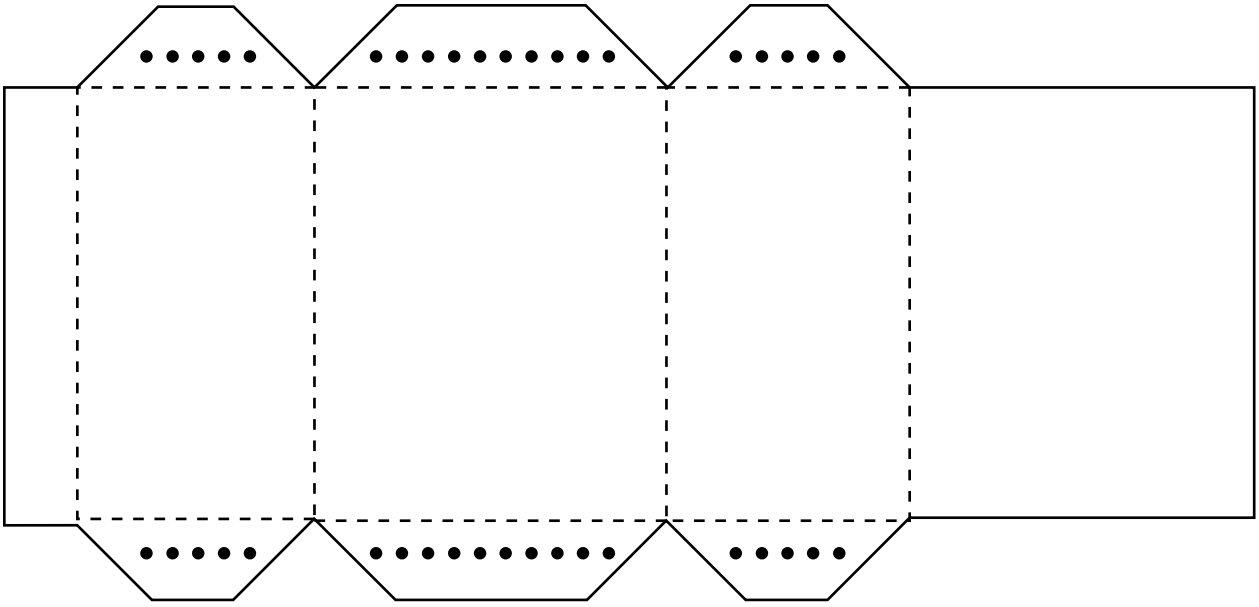


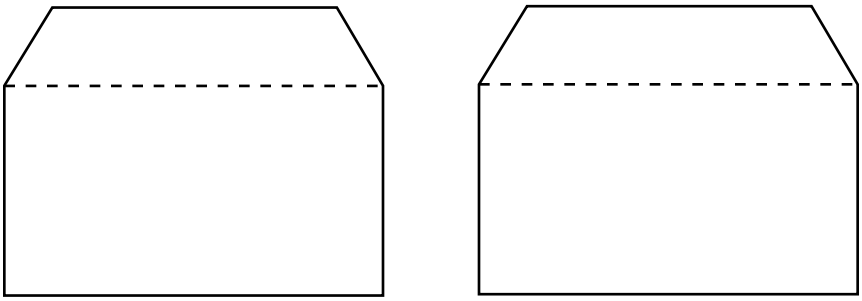


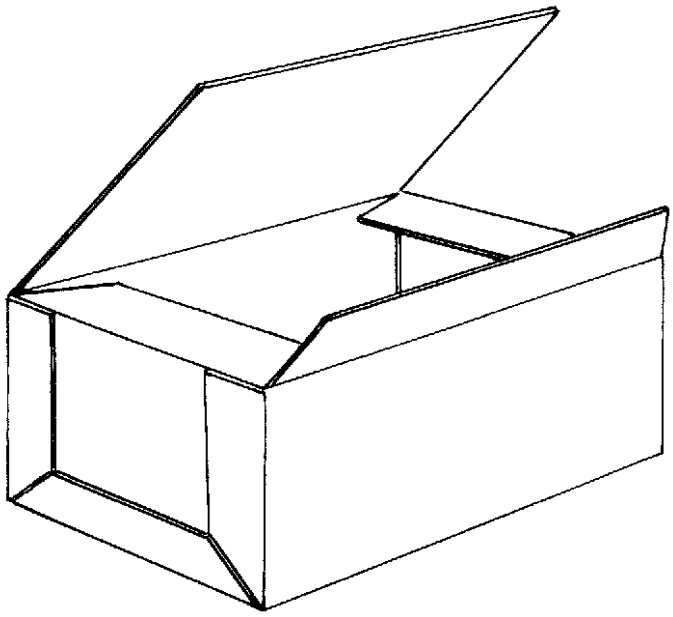


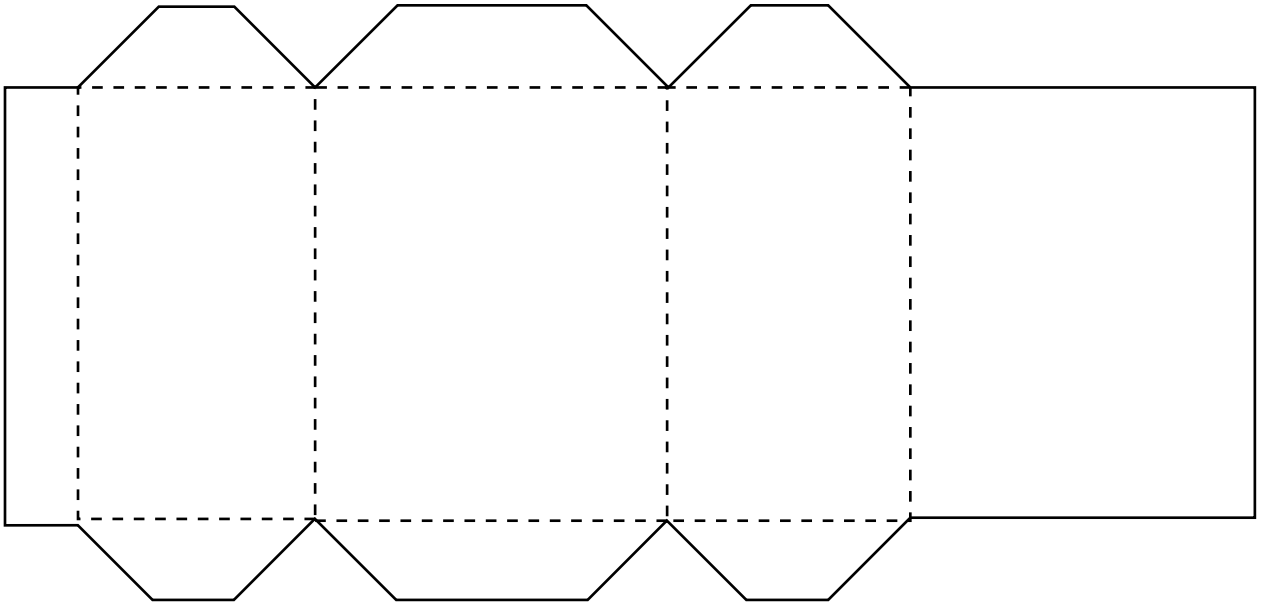


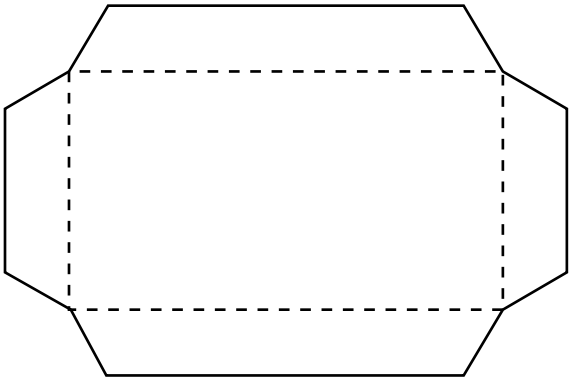
#4 BLISS BOX
(Intl. Box Code 0601)

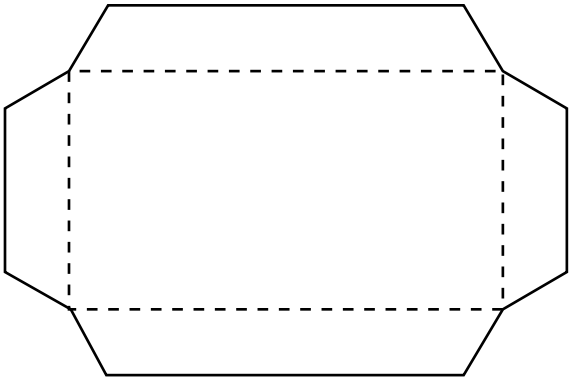


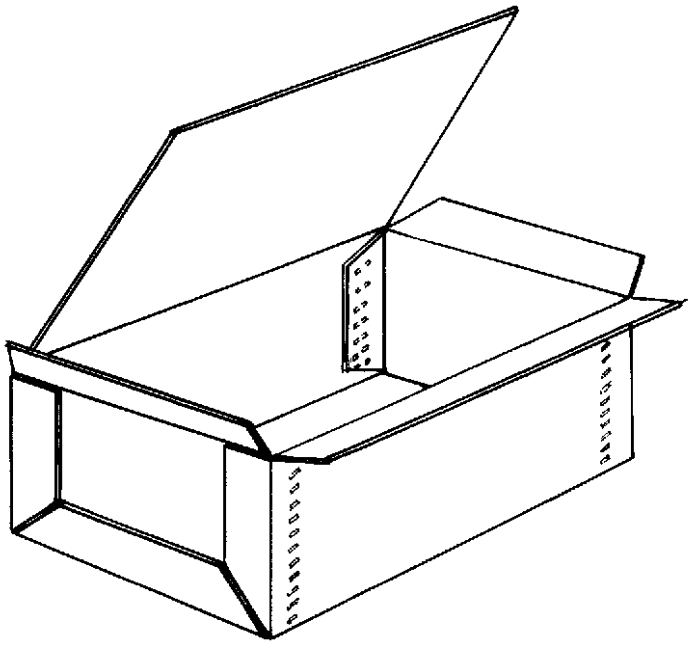


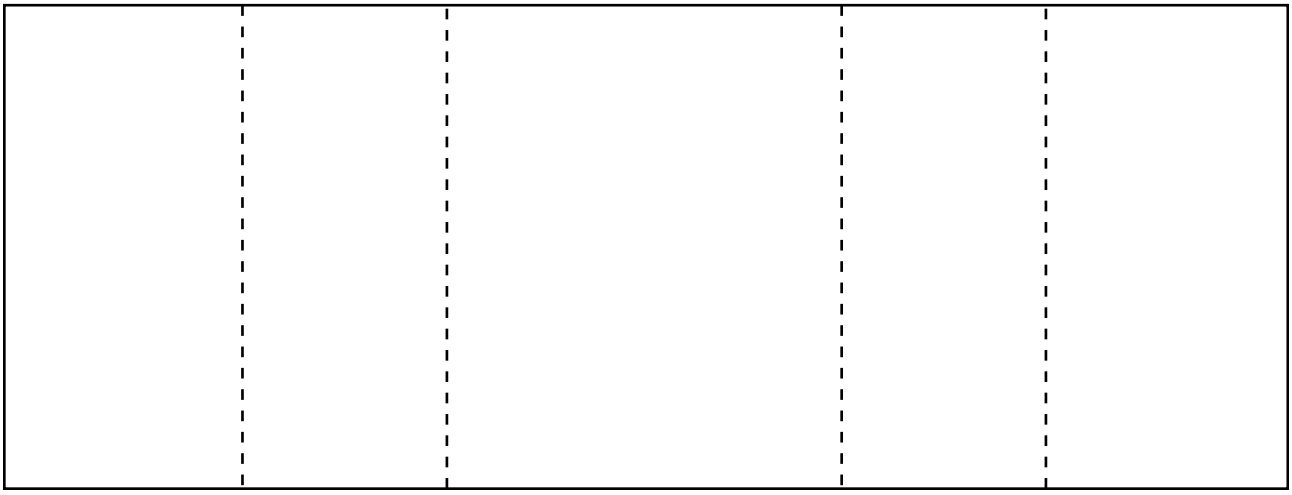


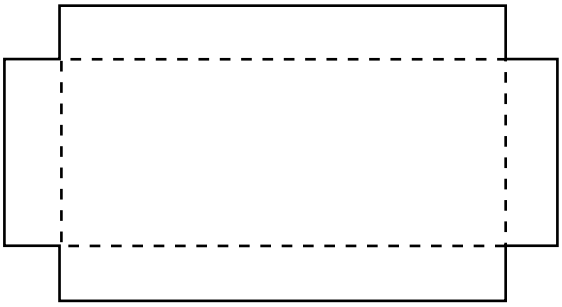


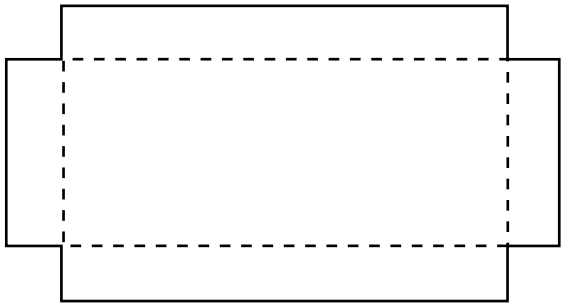


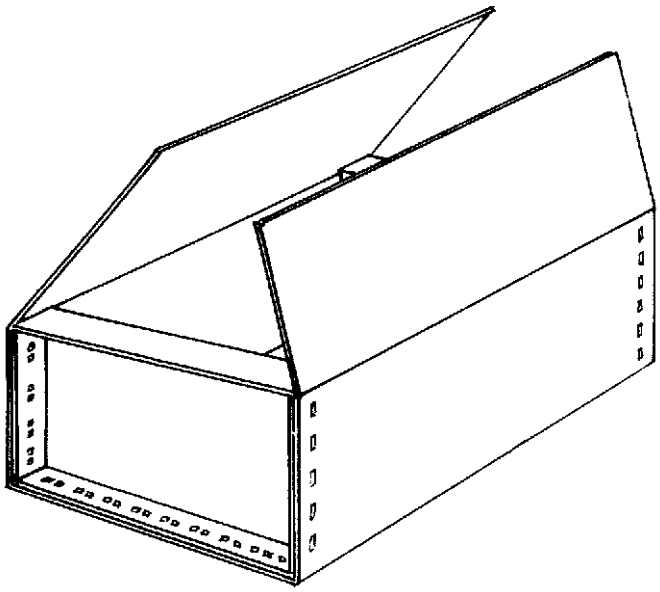


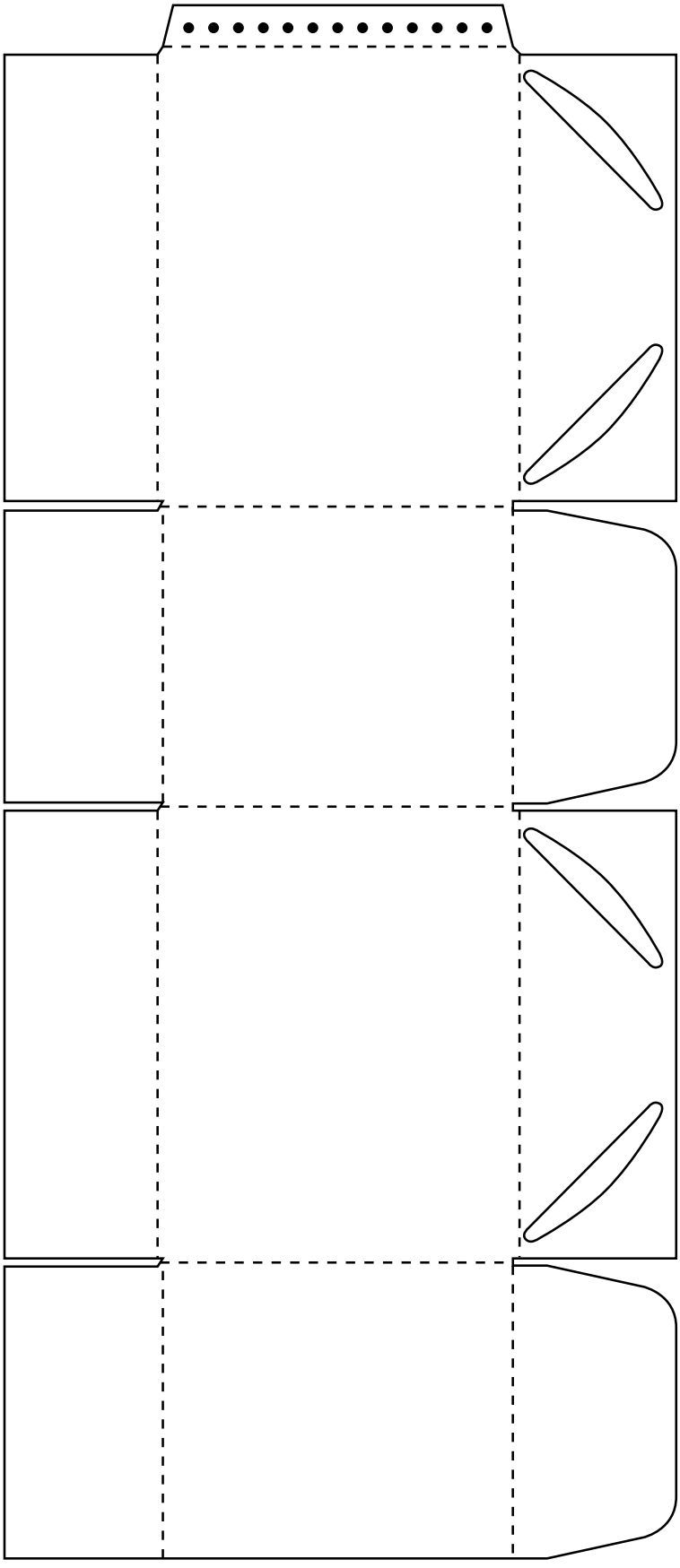


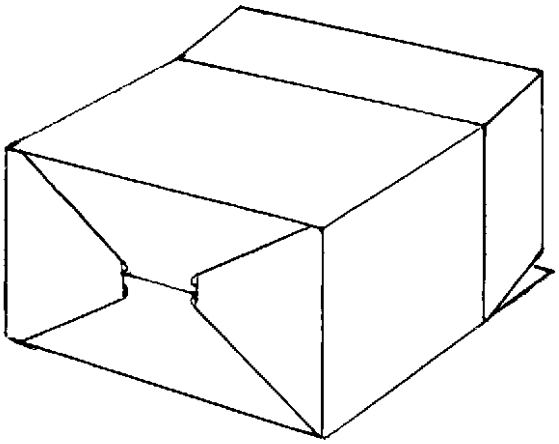




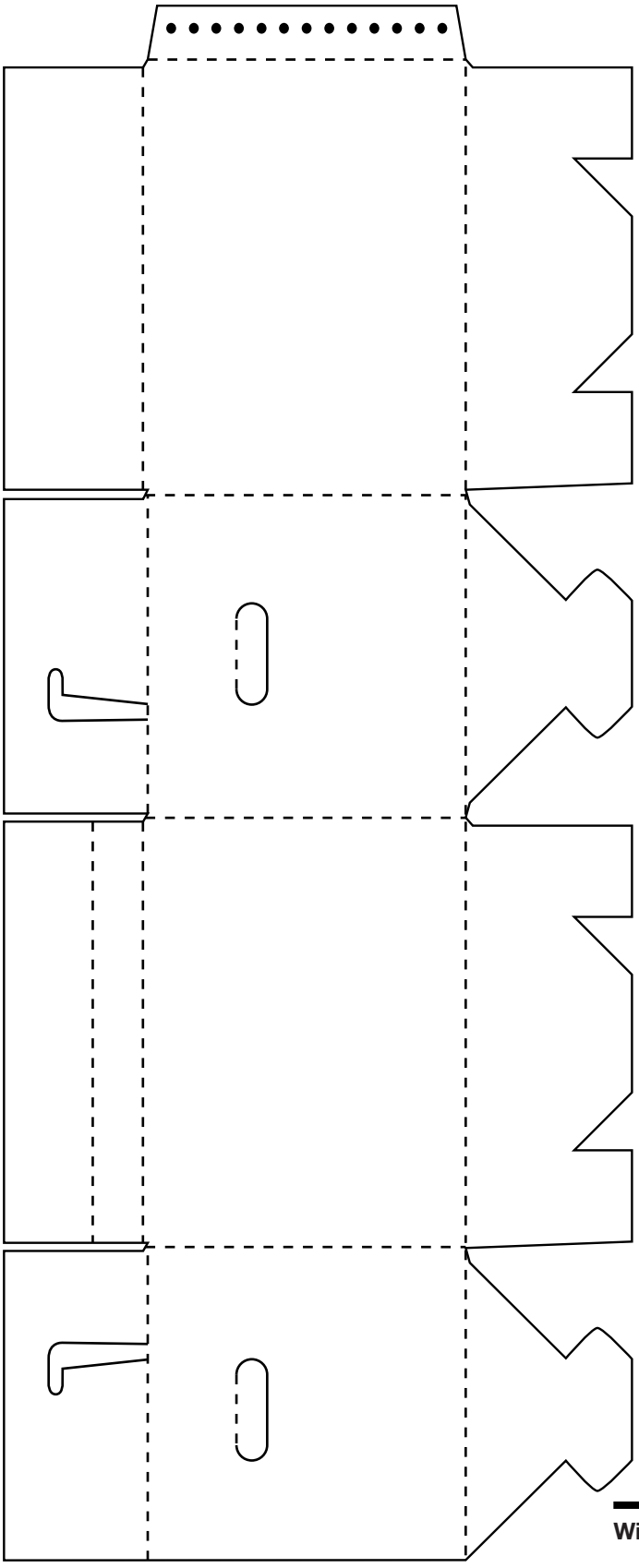




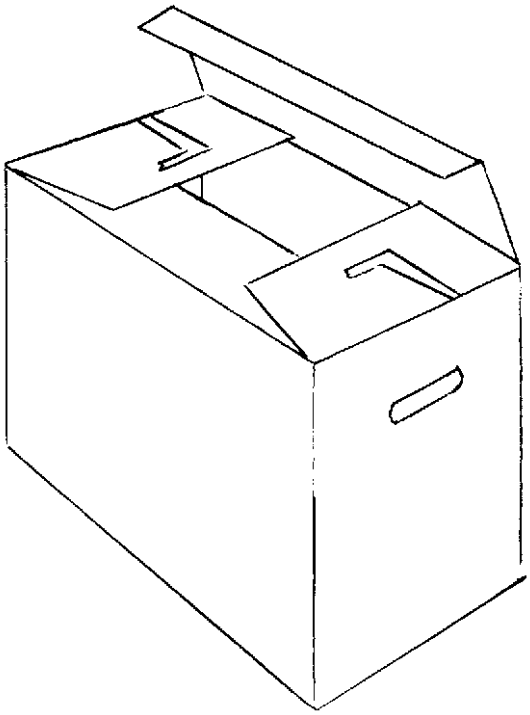




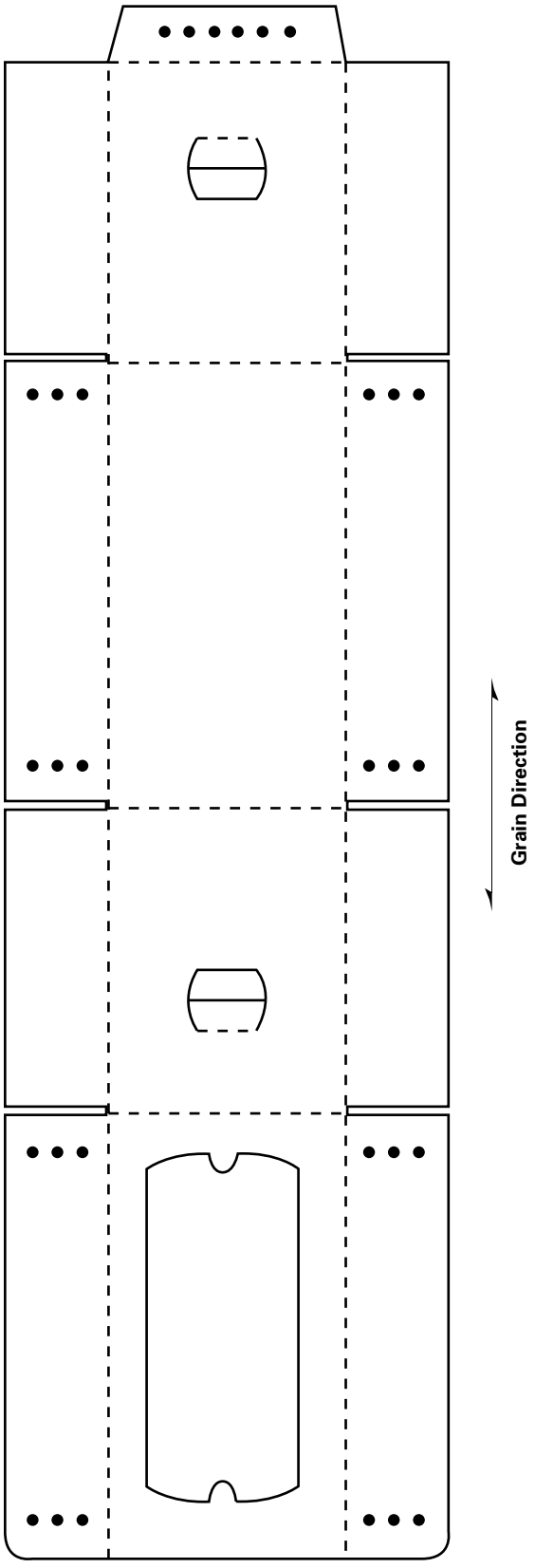
Container with auto-lock bottom variation and unique top closure makes for easy loading/ unloading.



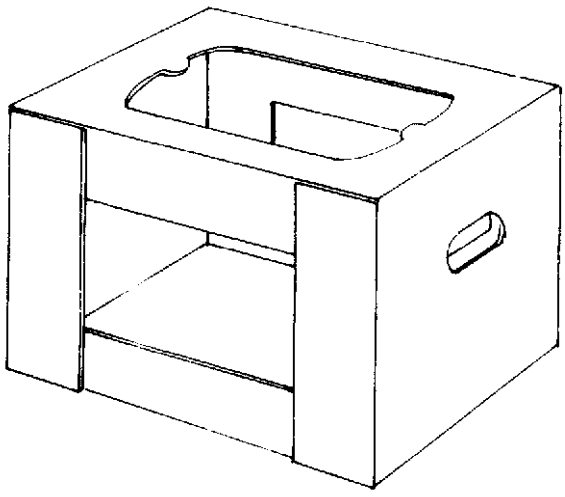
Grain Direction

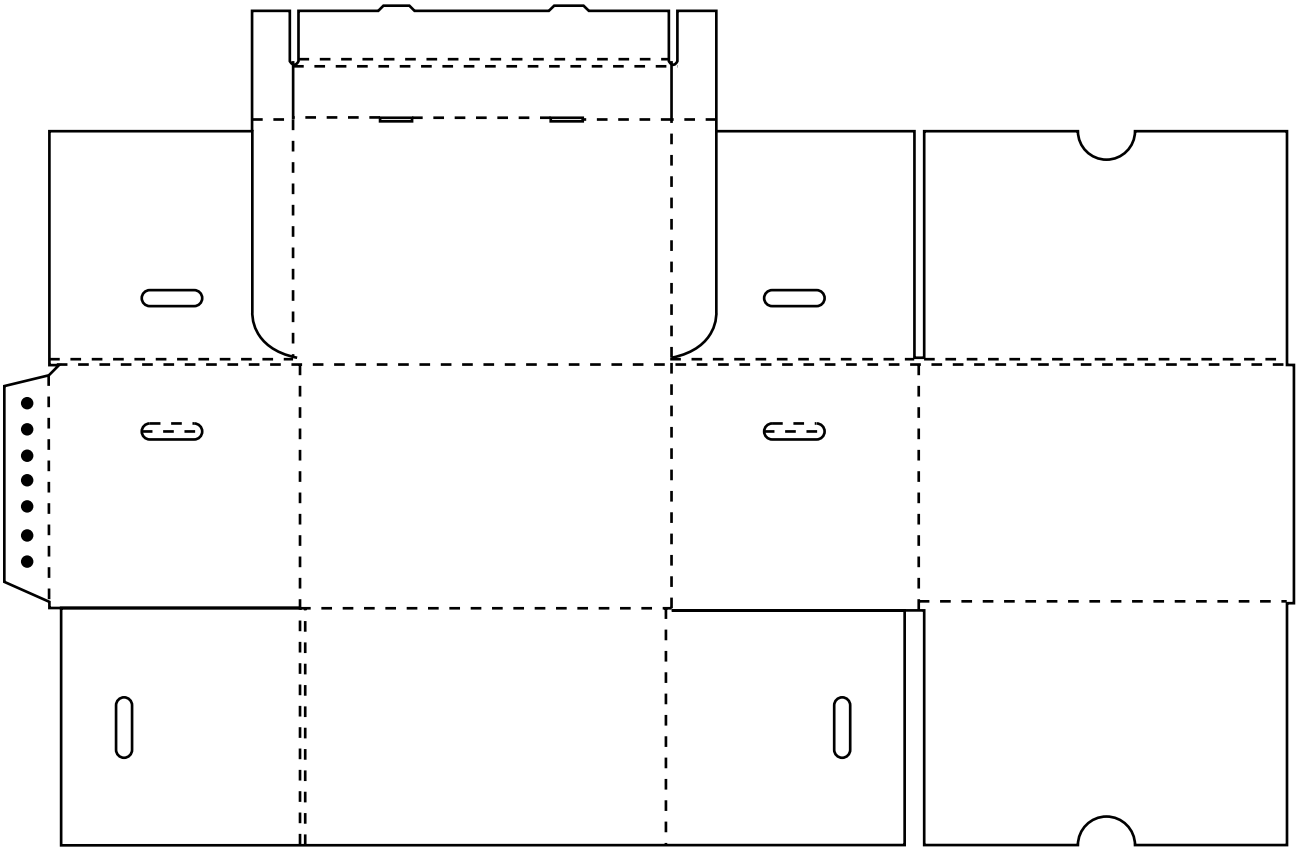


With auto-lock bottom and self-locking top closure.

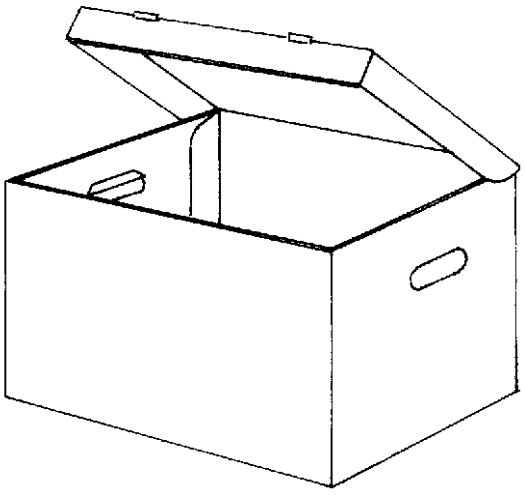


This eight-count two-liter soft drink carrier uses a minimum of corrugated board and serves as a display unit.

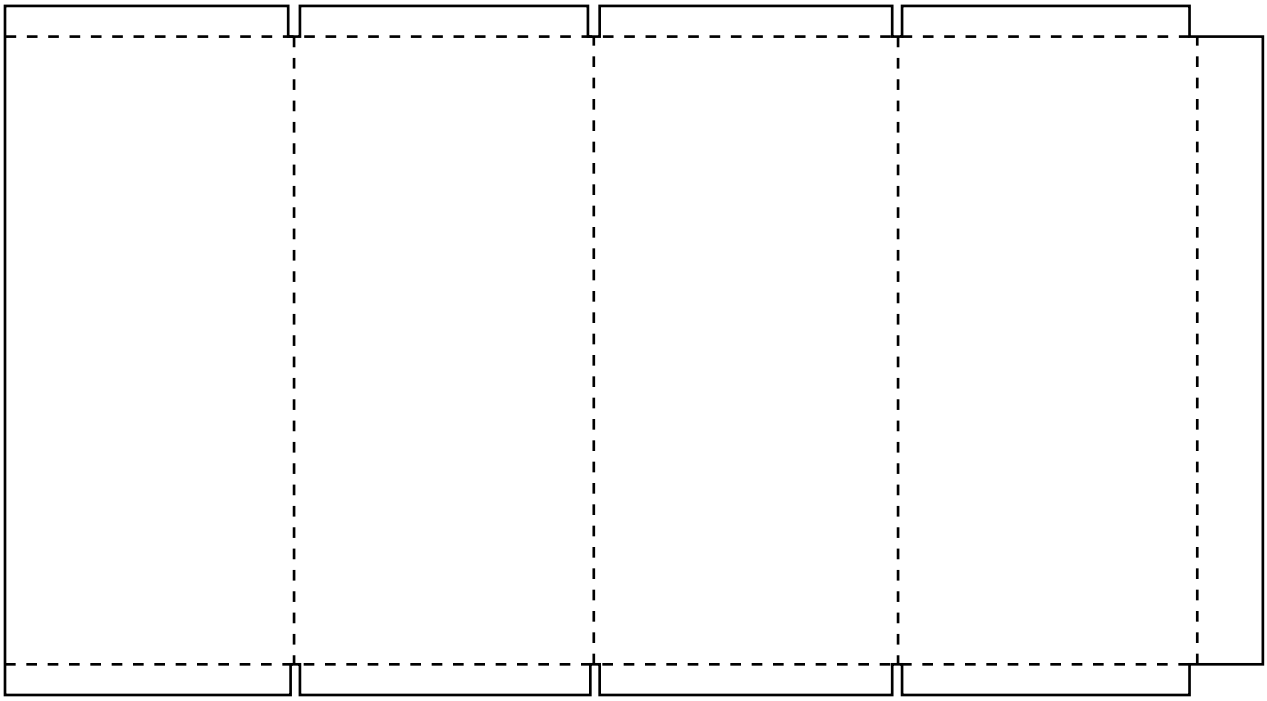


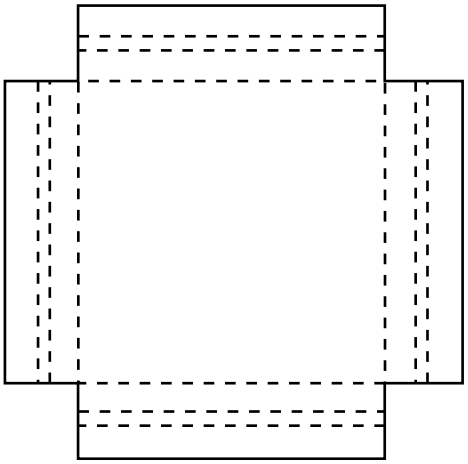


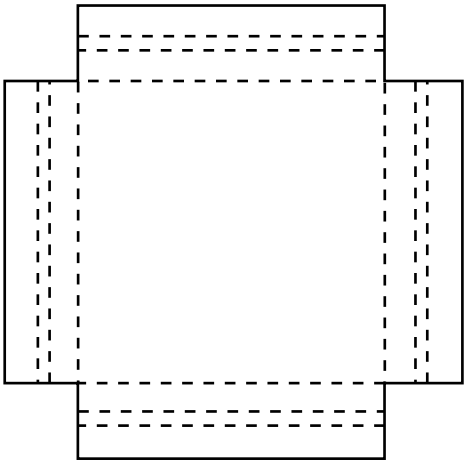
Double-over inner walls, hinged from the top, secure side panels in place. The two layers of the bottom and front wall as well as the triple sidewalls with carrying handles produce an excellent container for files.

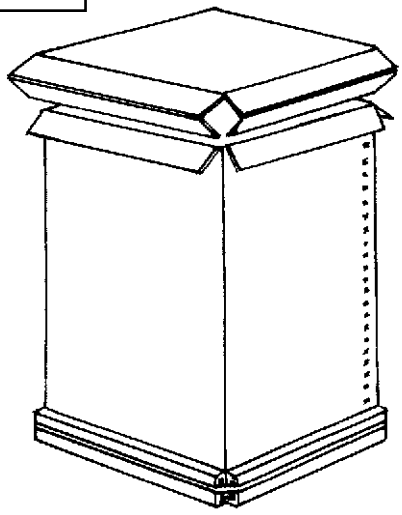


INTERLOCKING DOUBLE COVER BOX
(Intl. Box Code 0325)

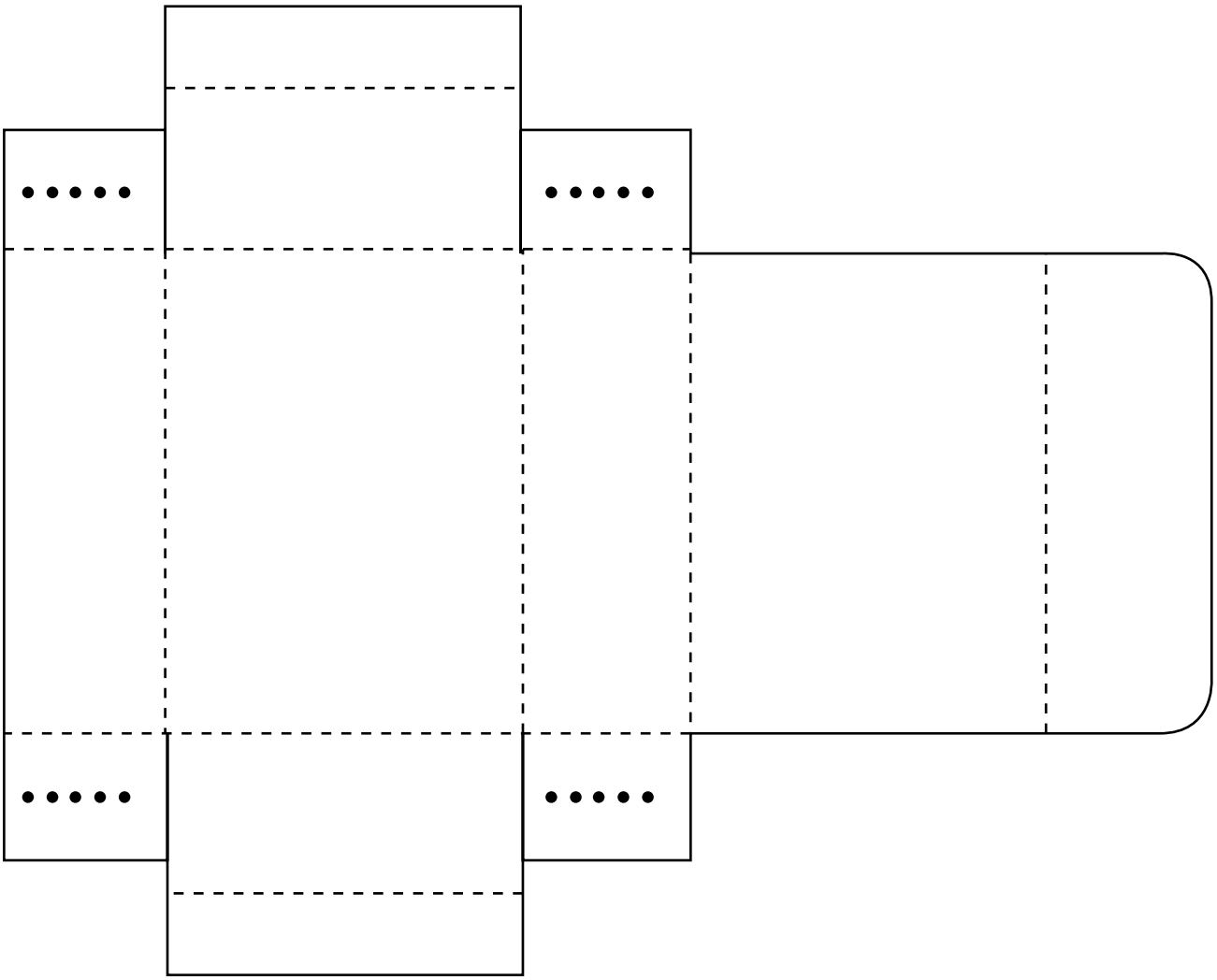


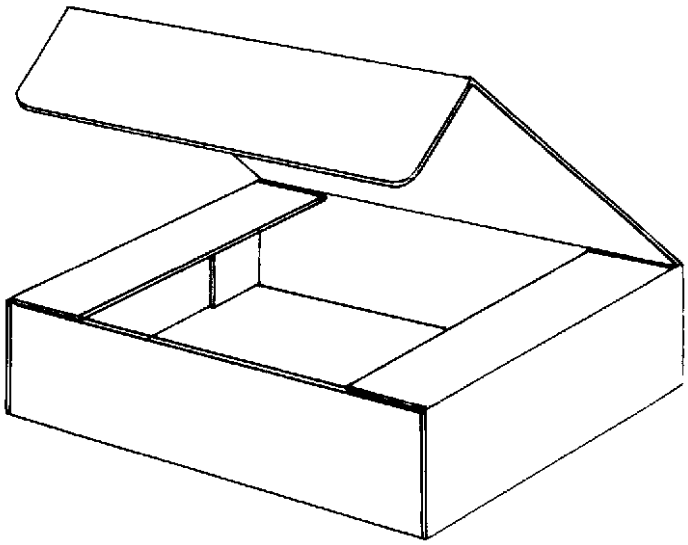






TUCK FOLDER
(Intl. Box Code 0420)





ONE-PIECE TELESCOPE BOX
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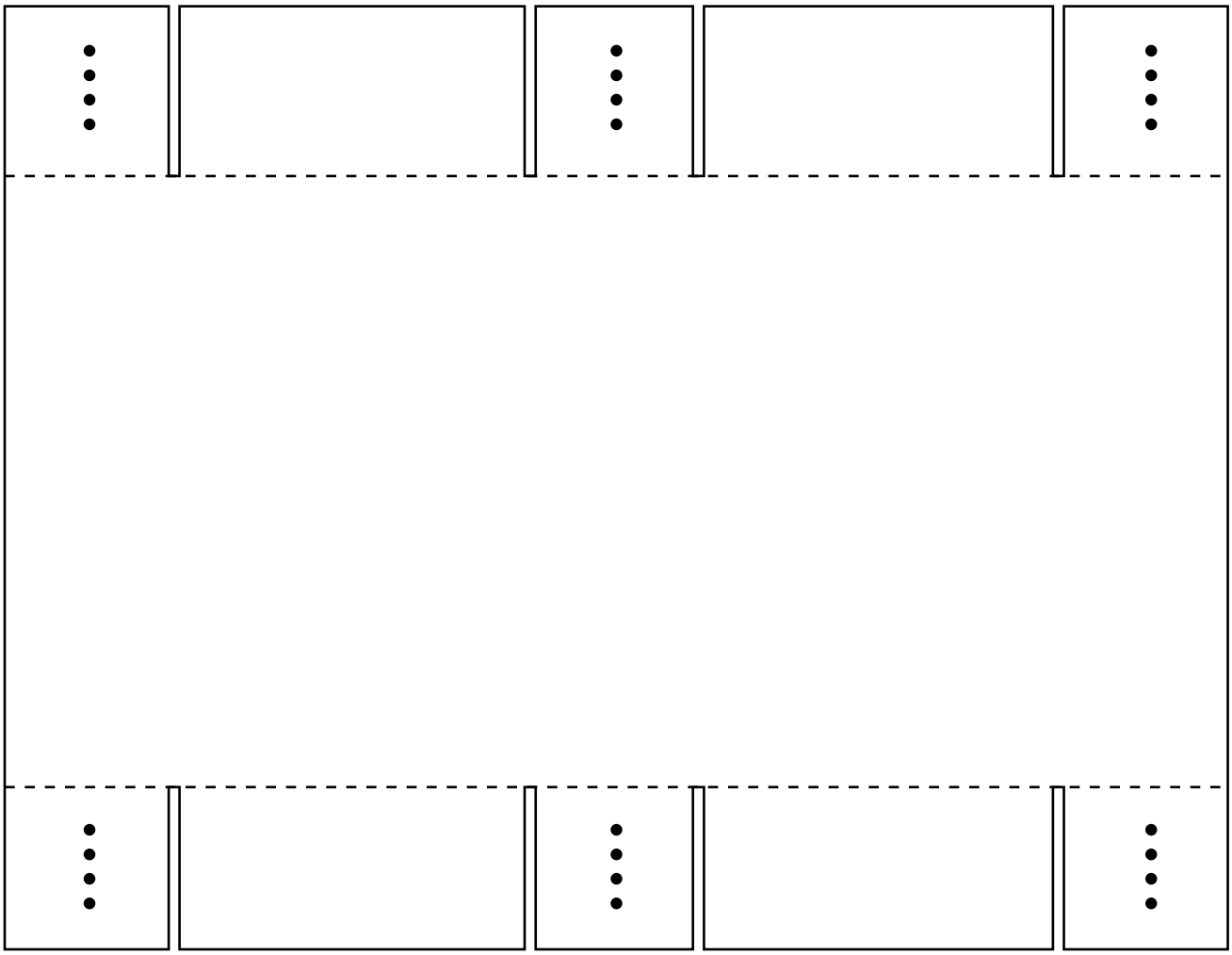
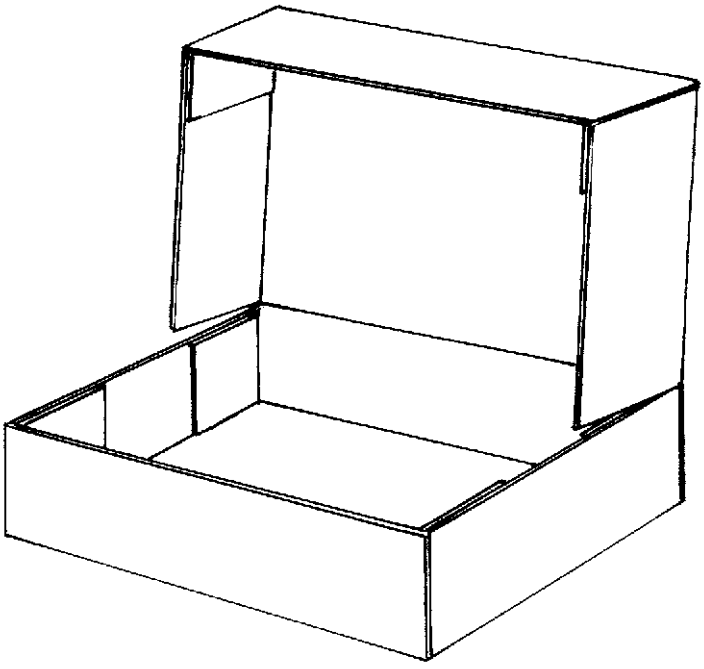
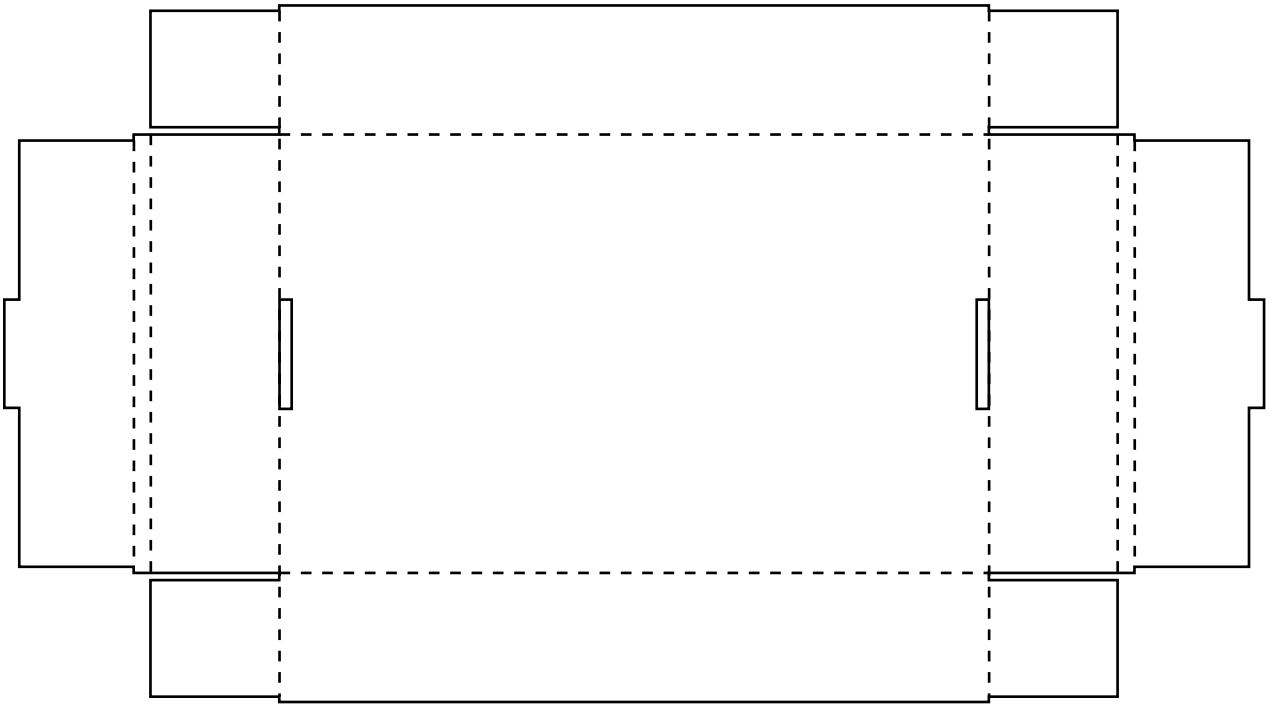
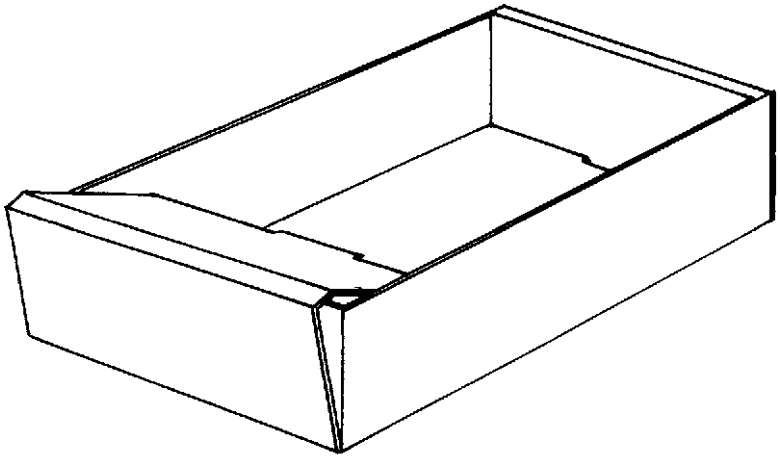
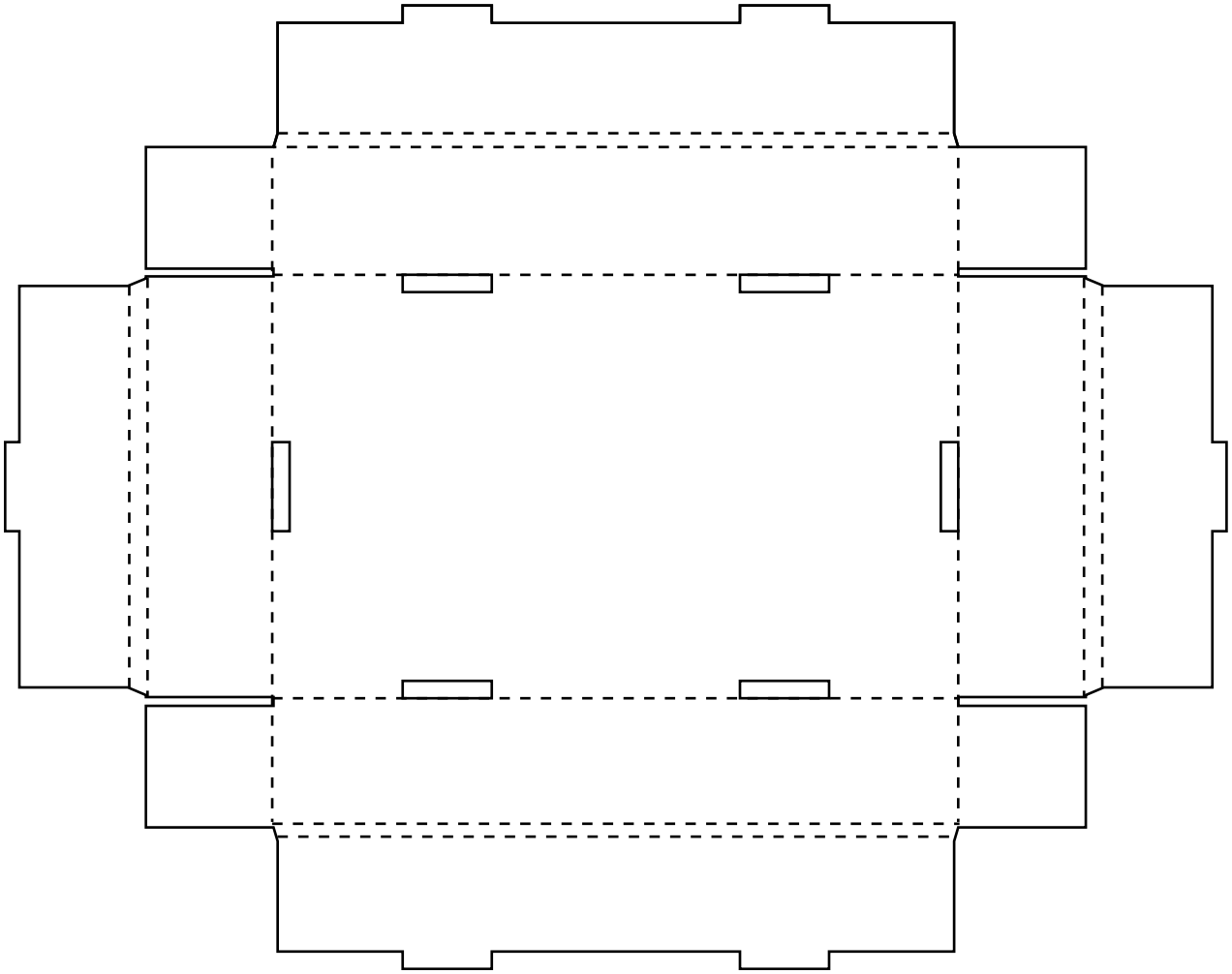


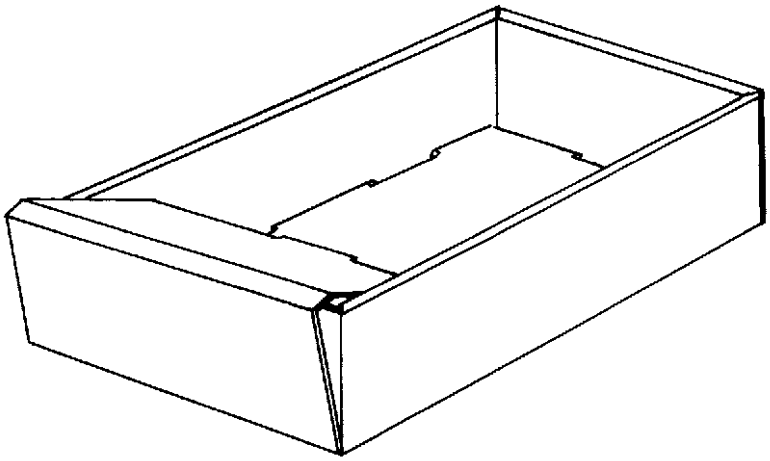


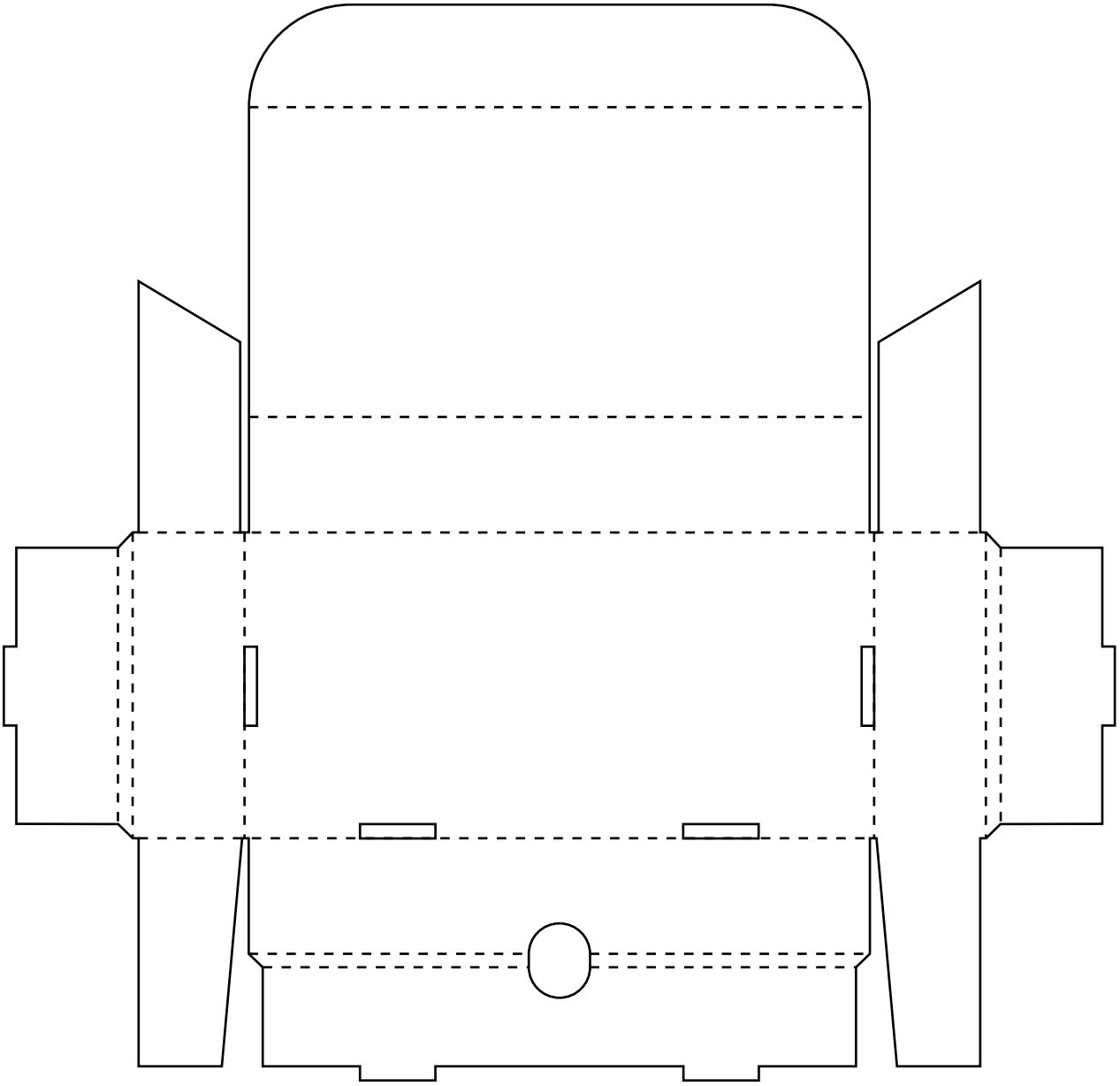
DOUBLE END WALL SELF-LOCKING TRAY
(Intl. Box Code 0422)

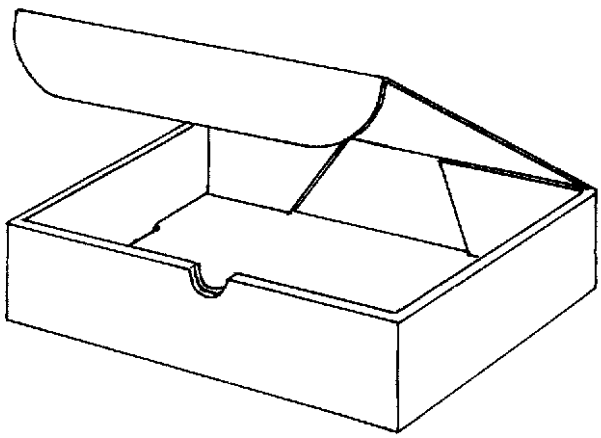


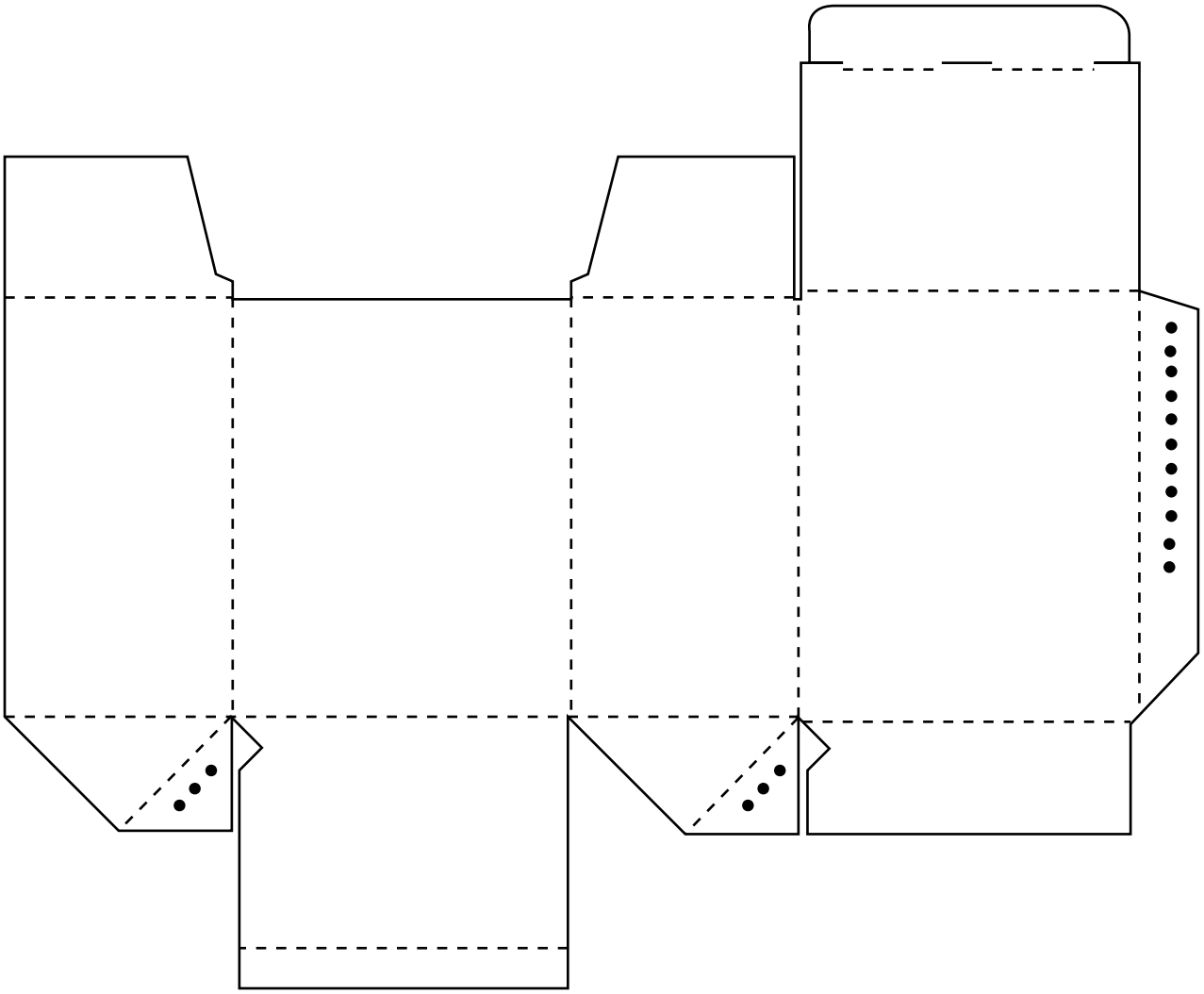


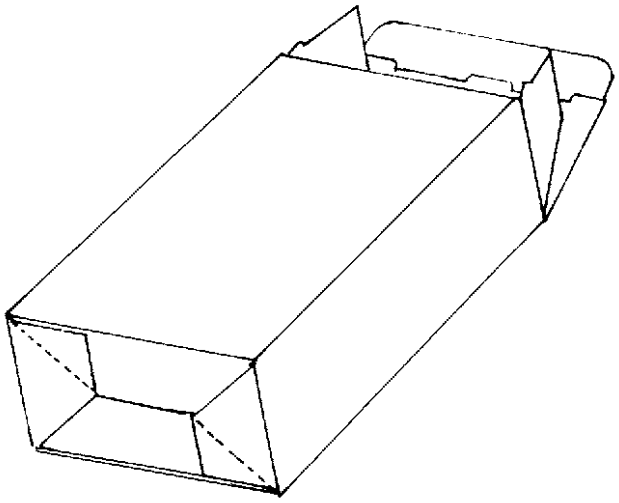


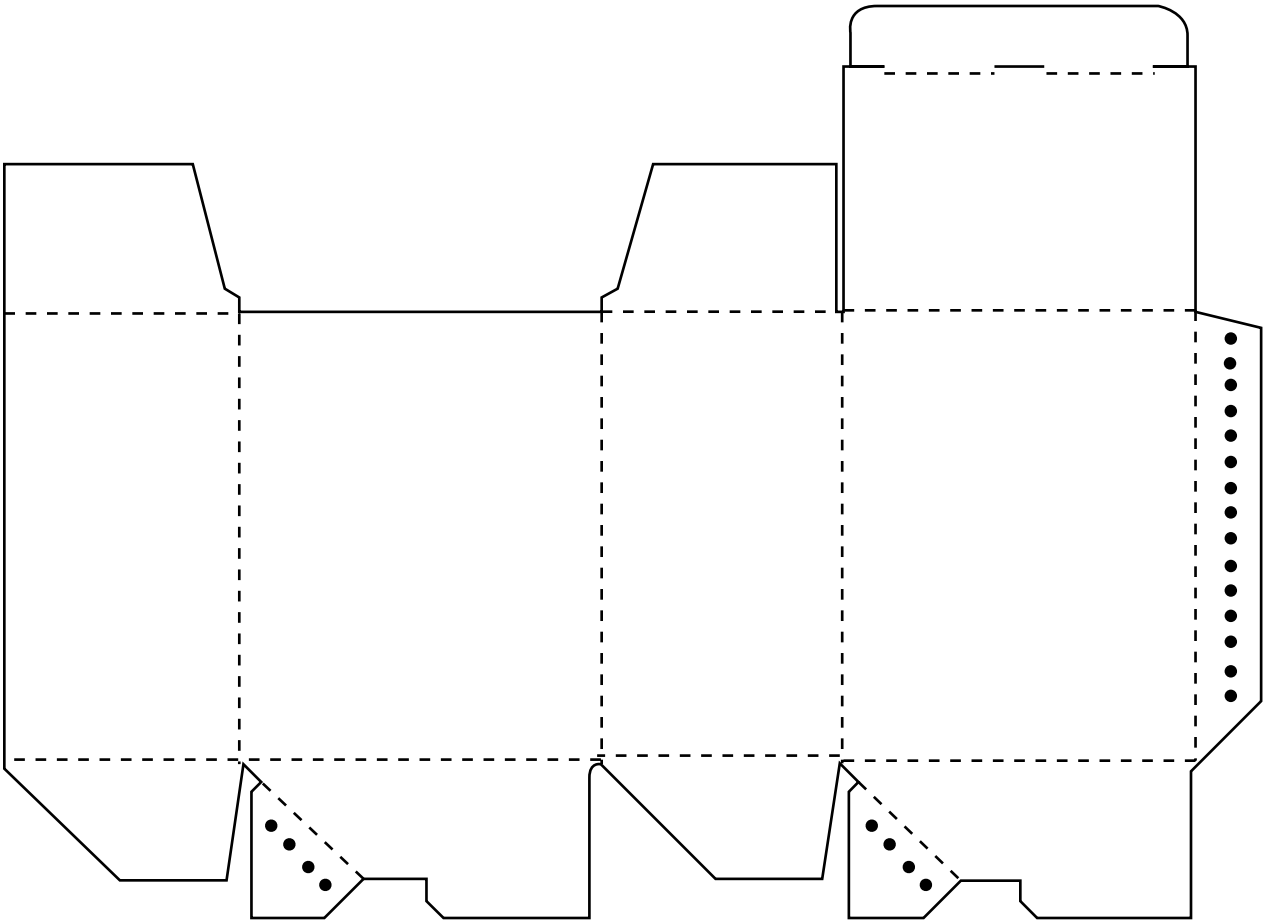


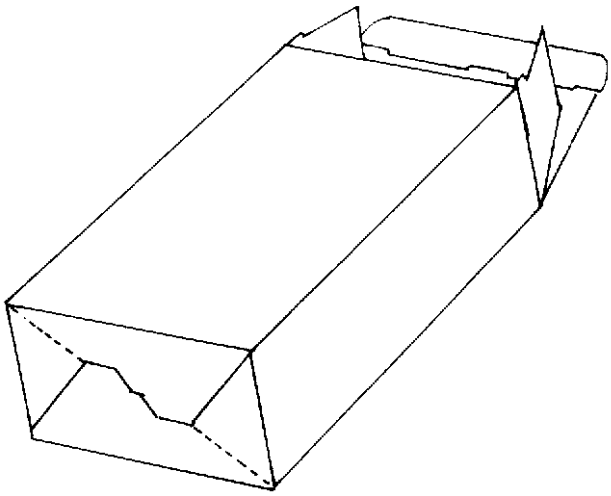


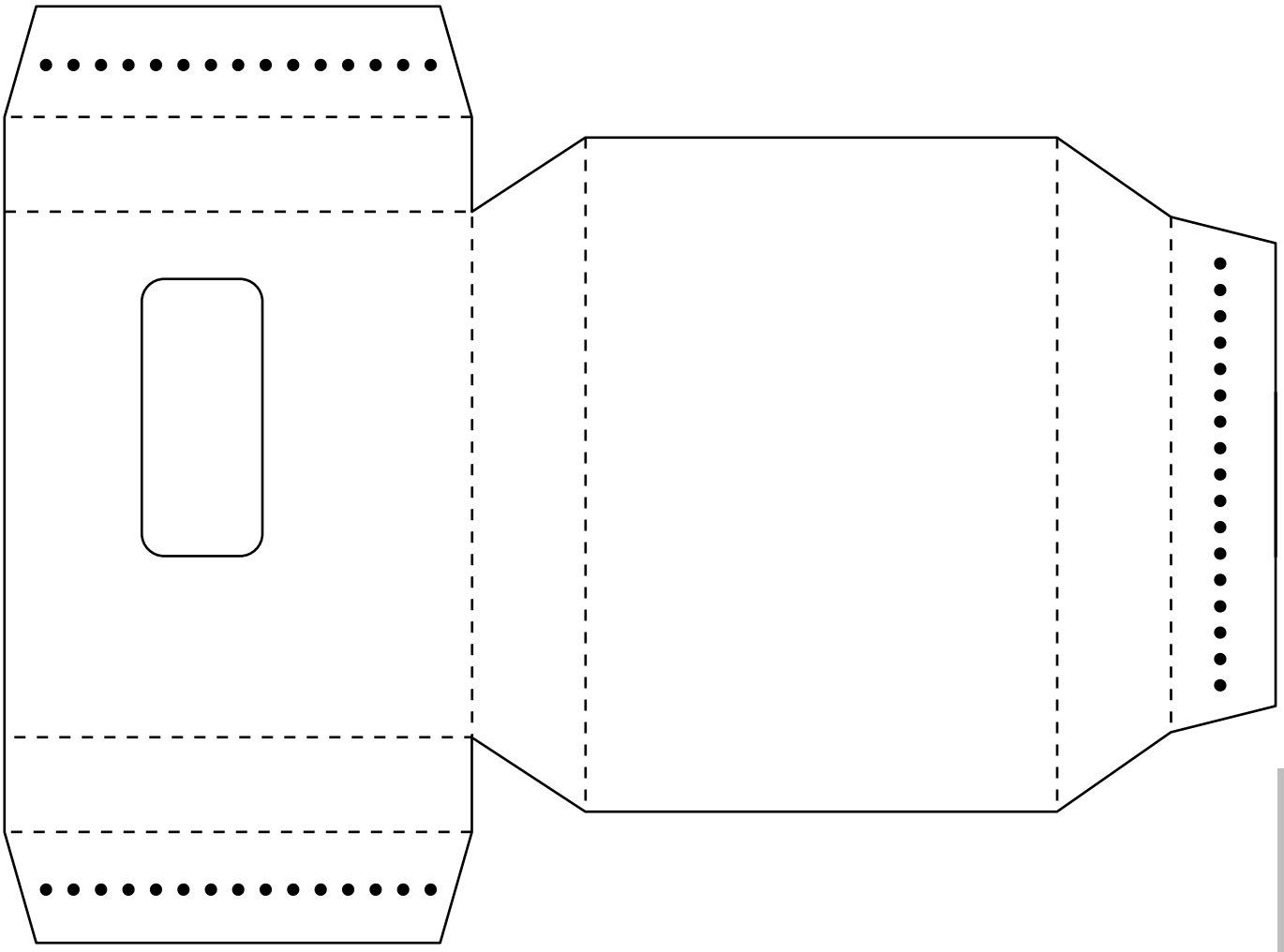


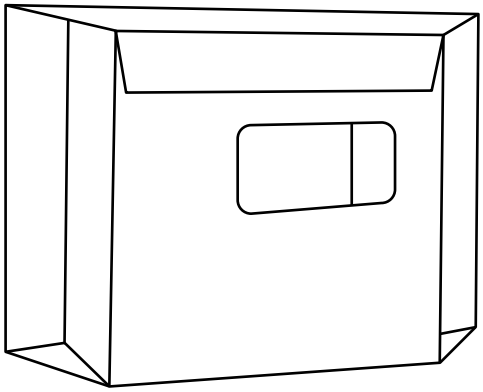




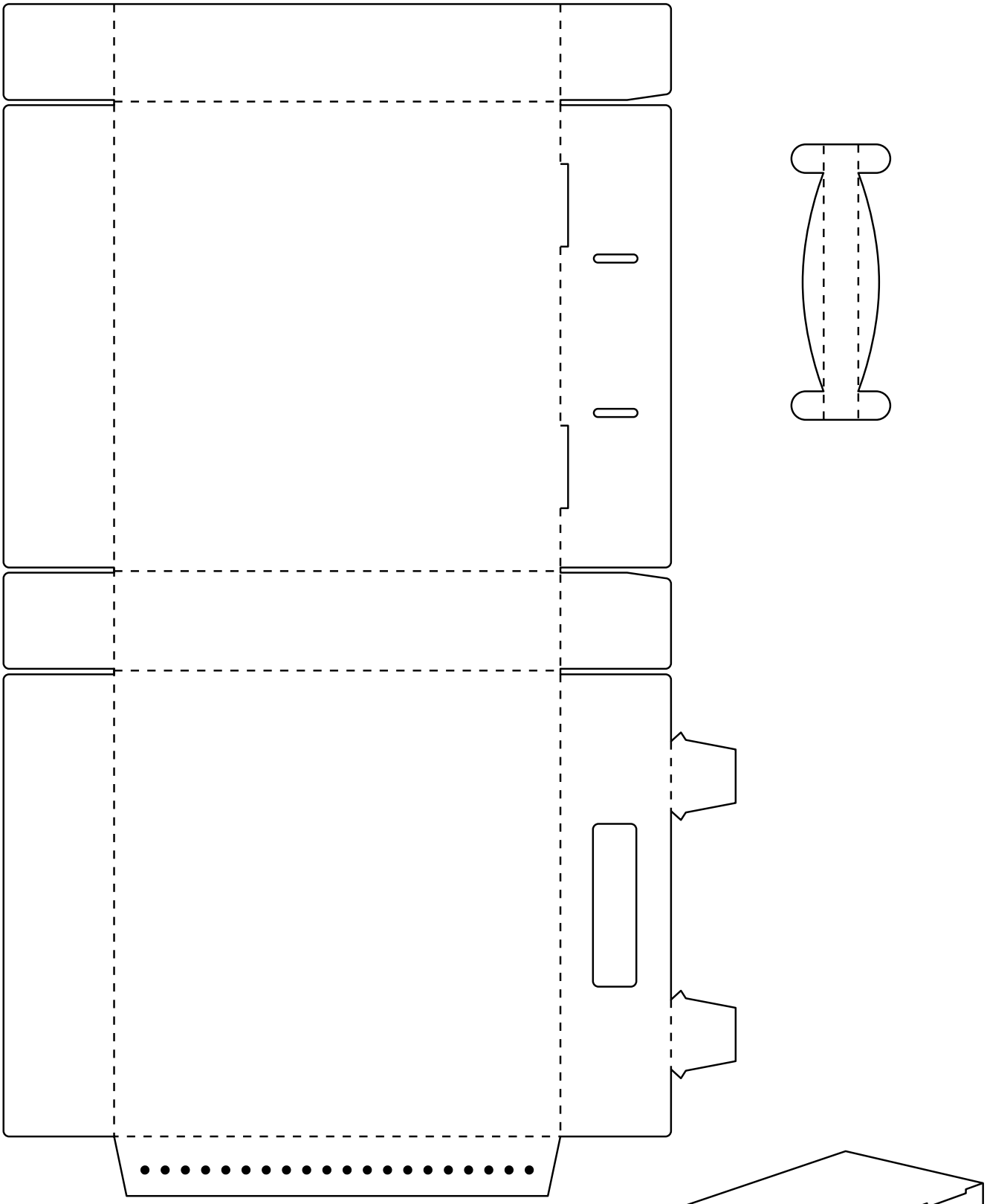


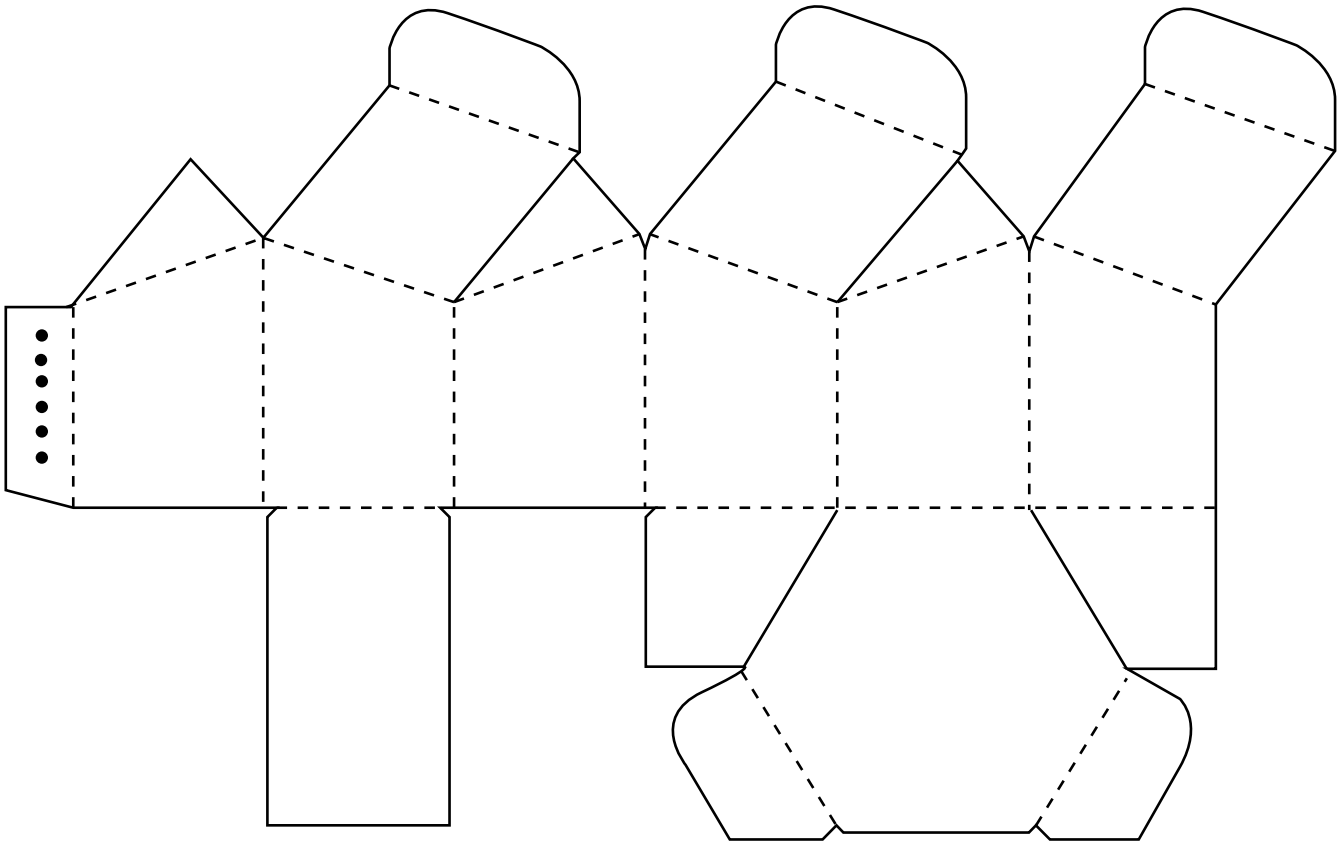


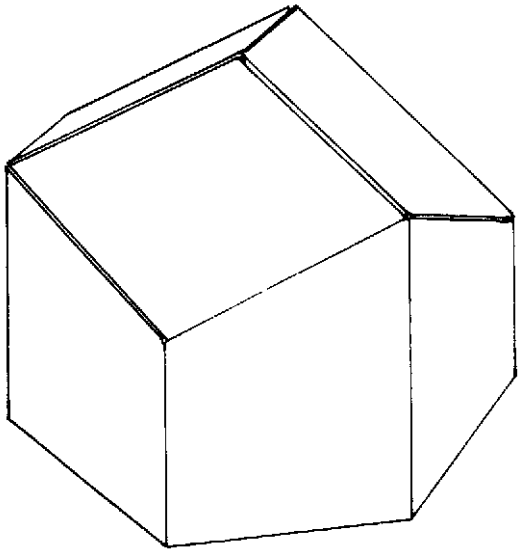




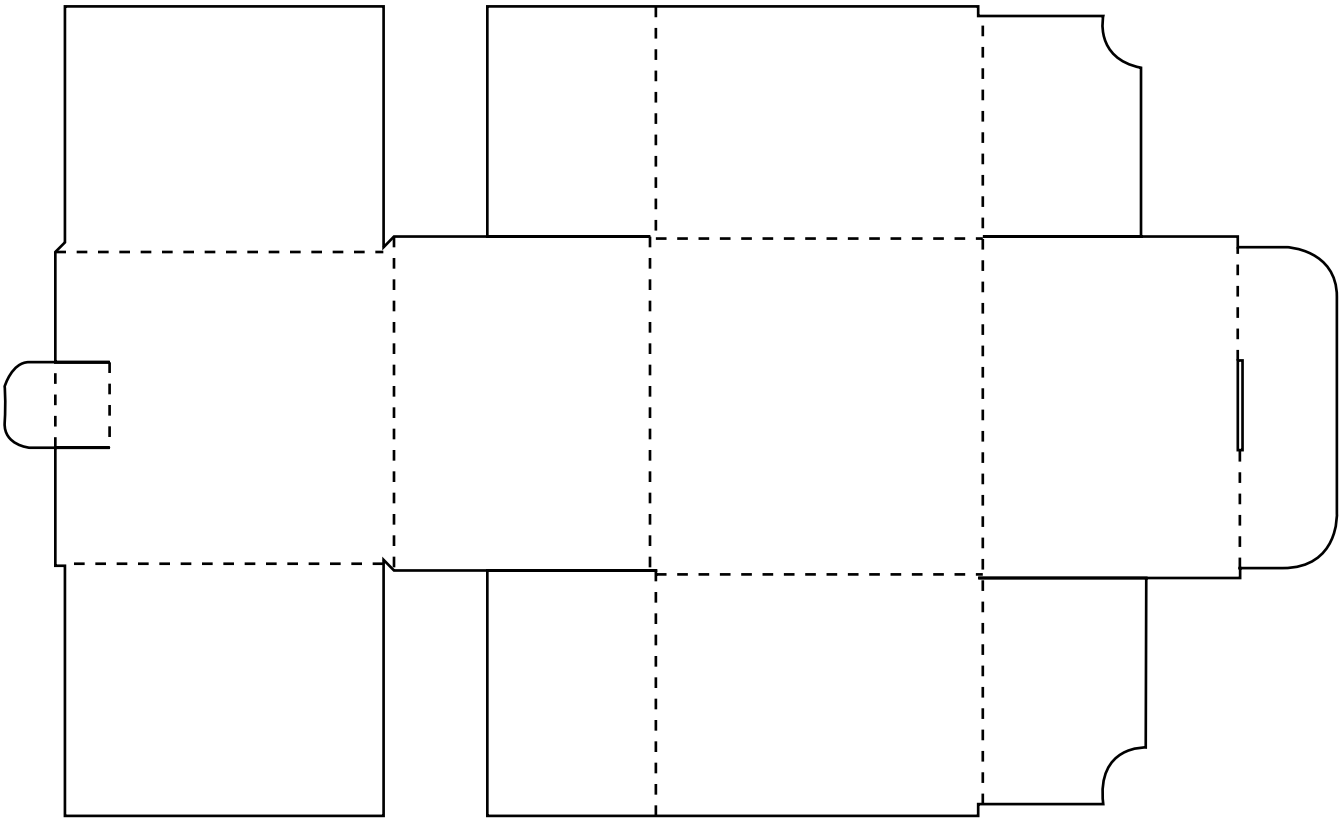
The recessed corners help protect the product and the die-cut window allows for addressee instructions.



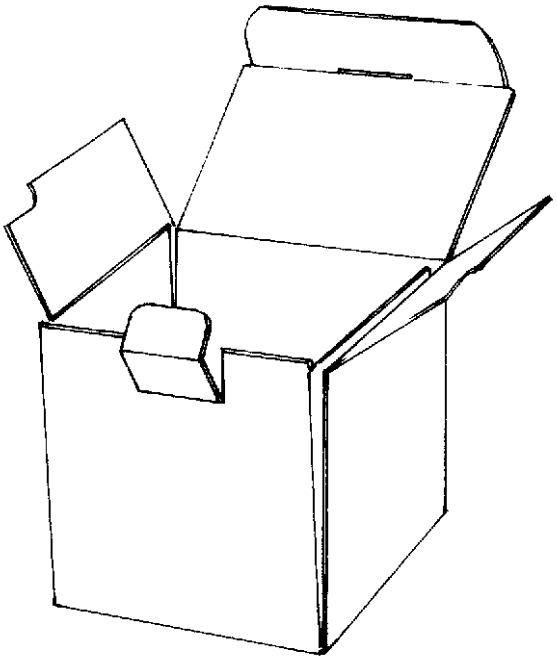


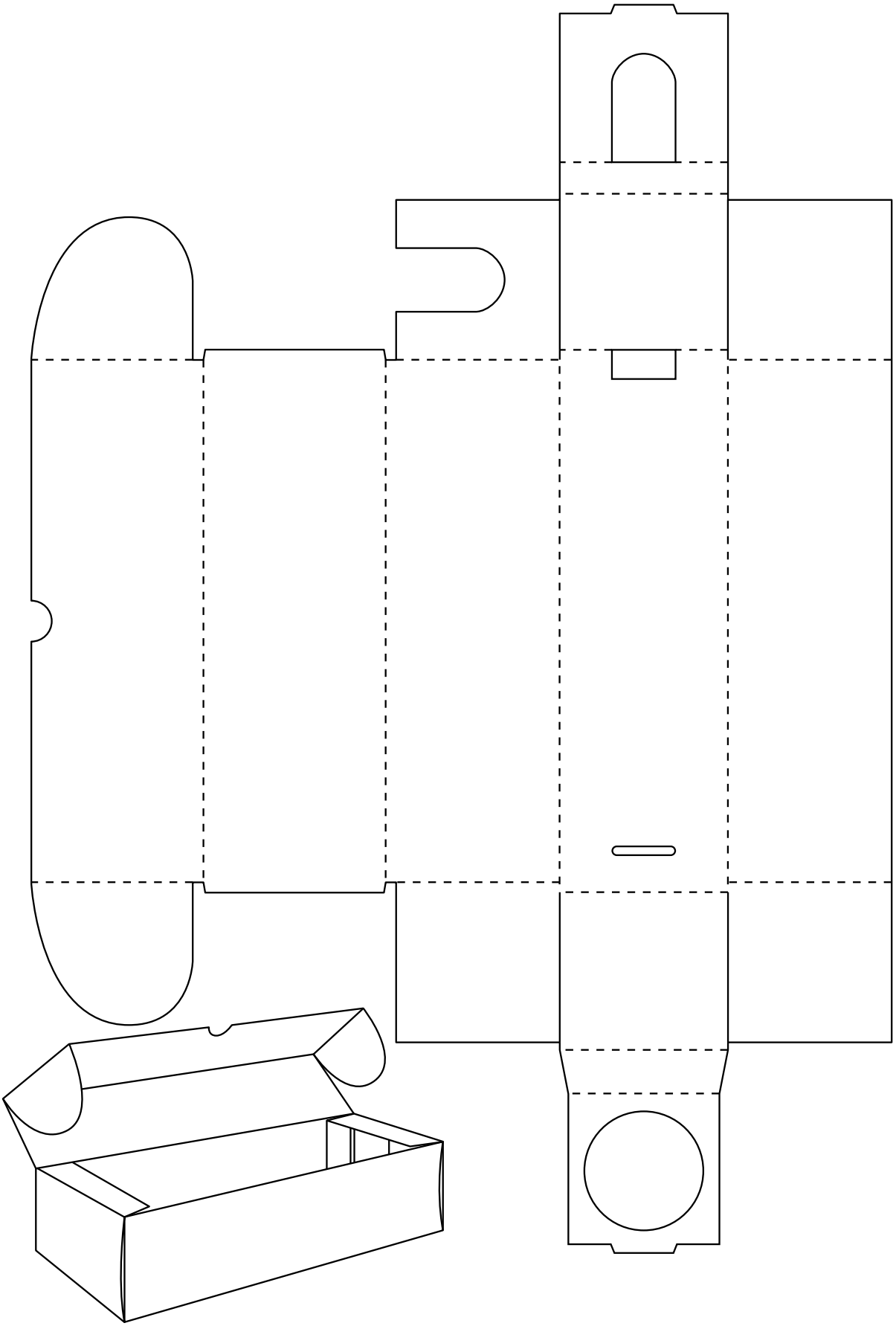


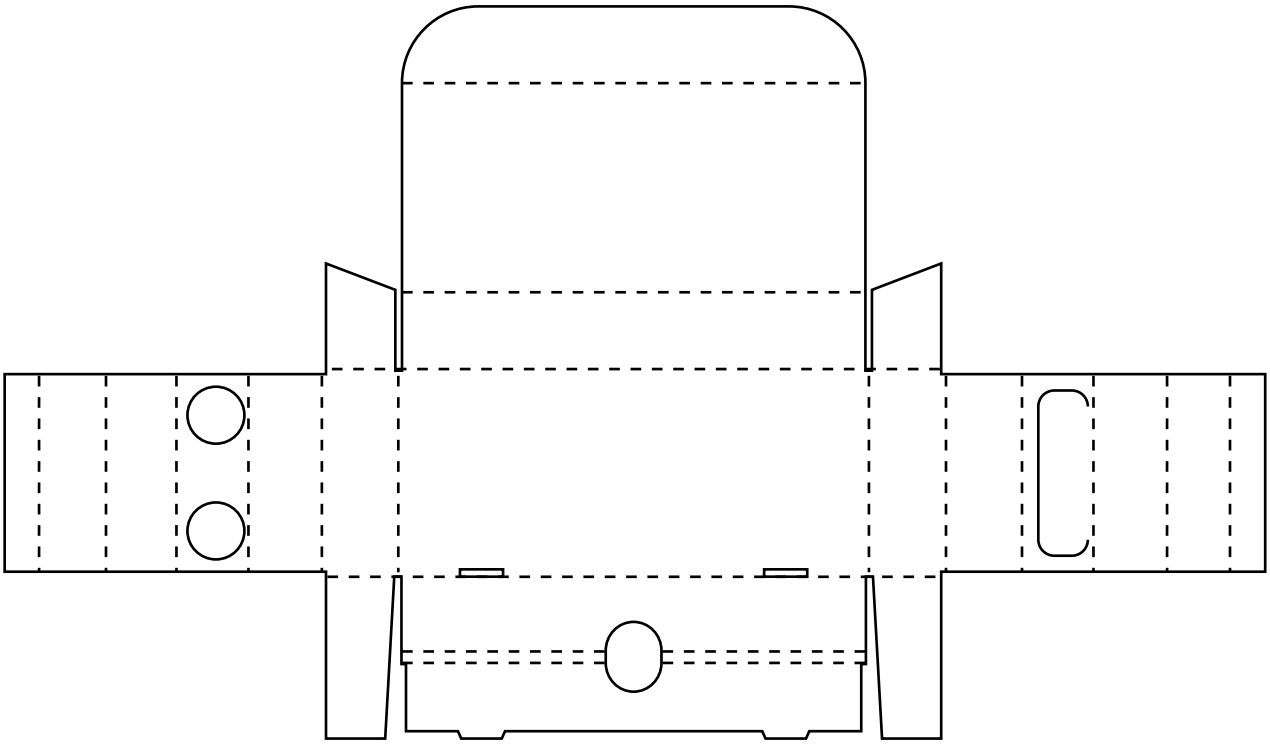
Developed by contemporary designer John Edminster, this structure provides a decorative, reclosable three-faceted top for a hexagonal carton.



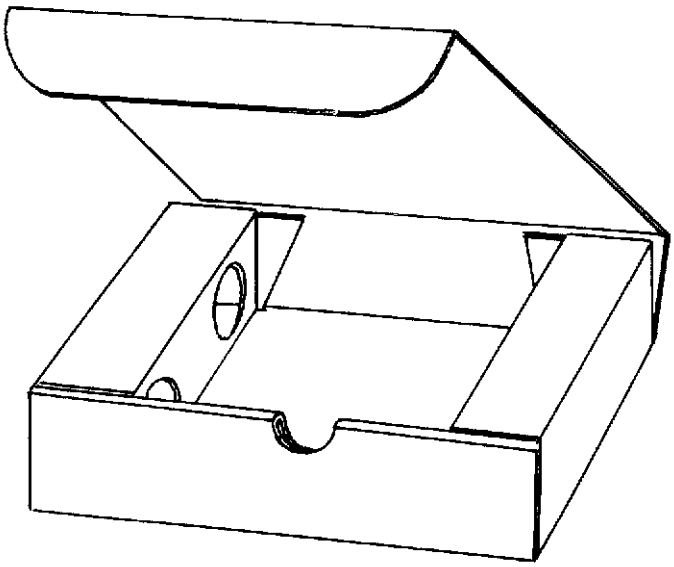
This blank folds into a sturdy container for heavy products, in this case a 5 lb. spool of picture wire.



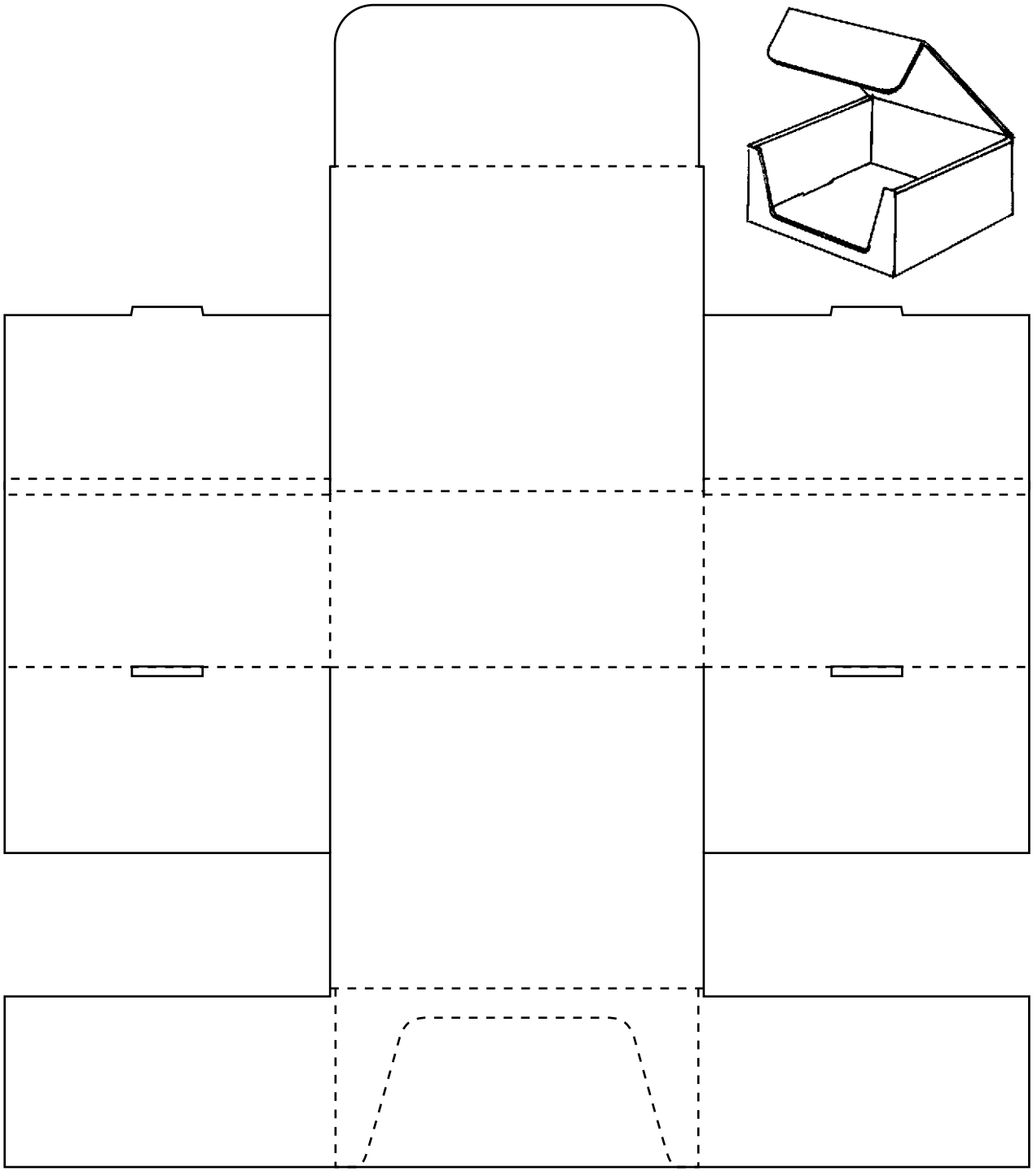


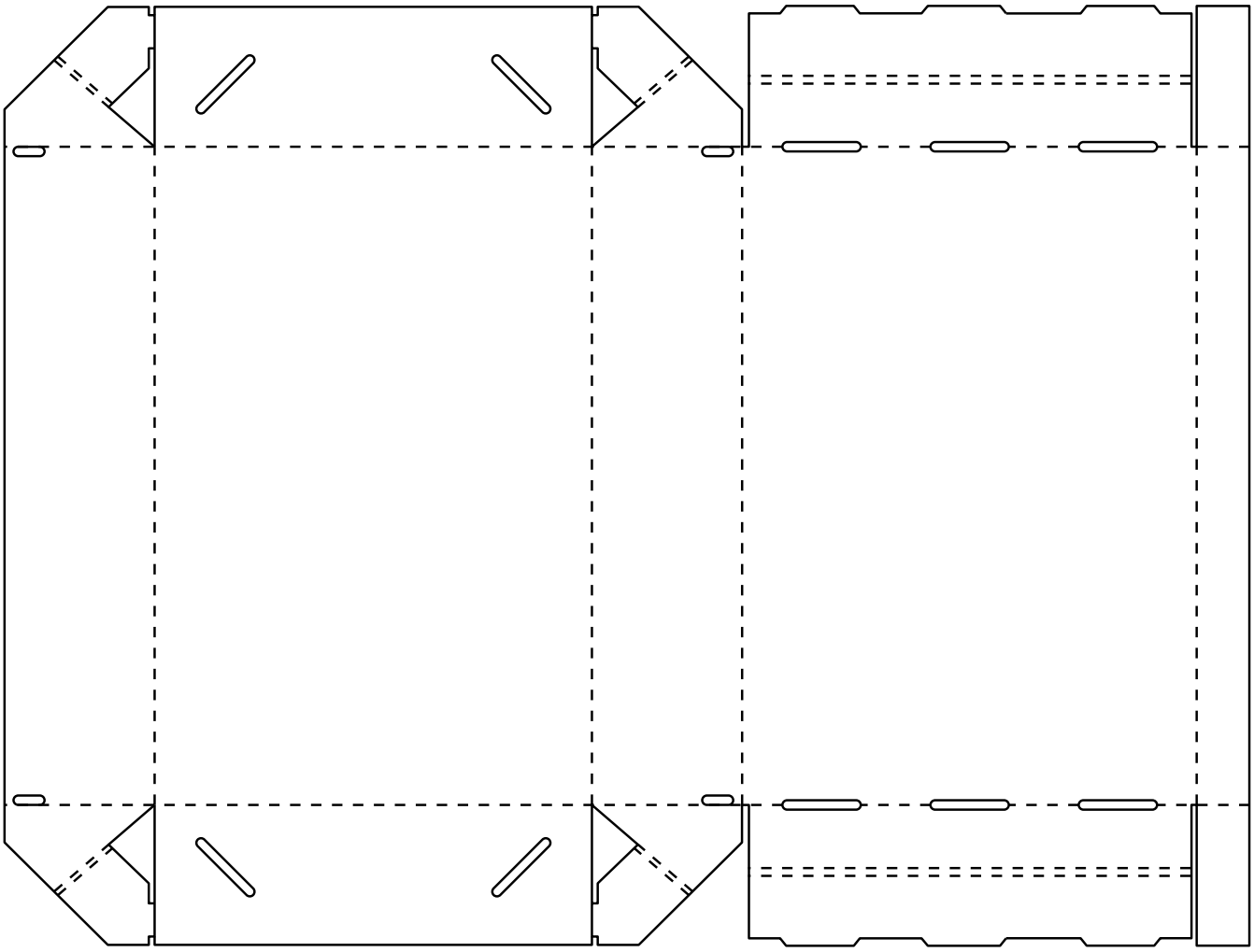


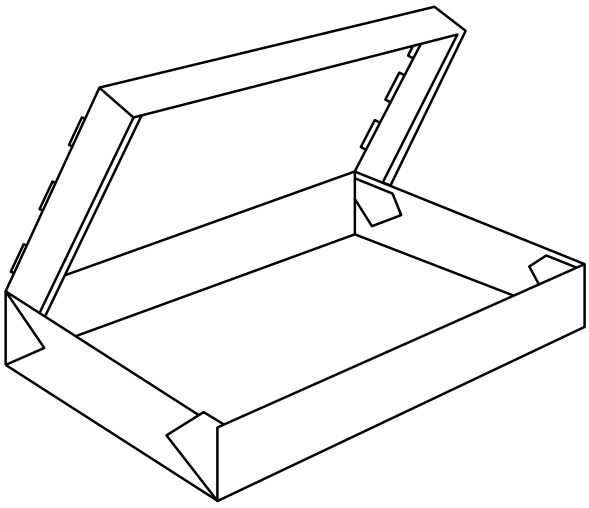
This sample has supports for a U-shaped light bulb.

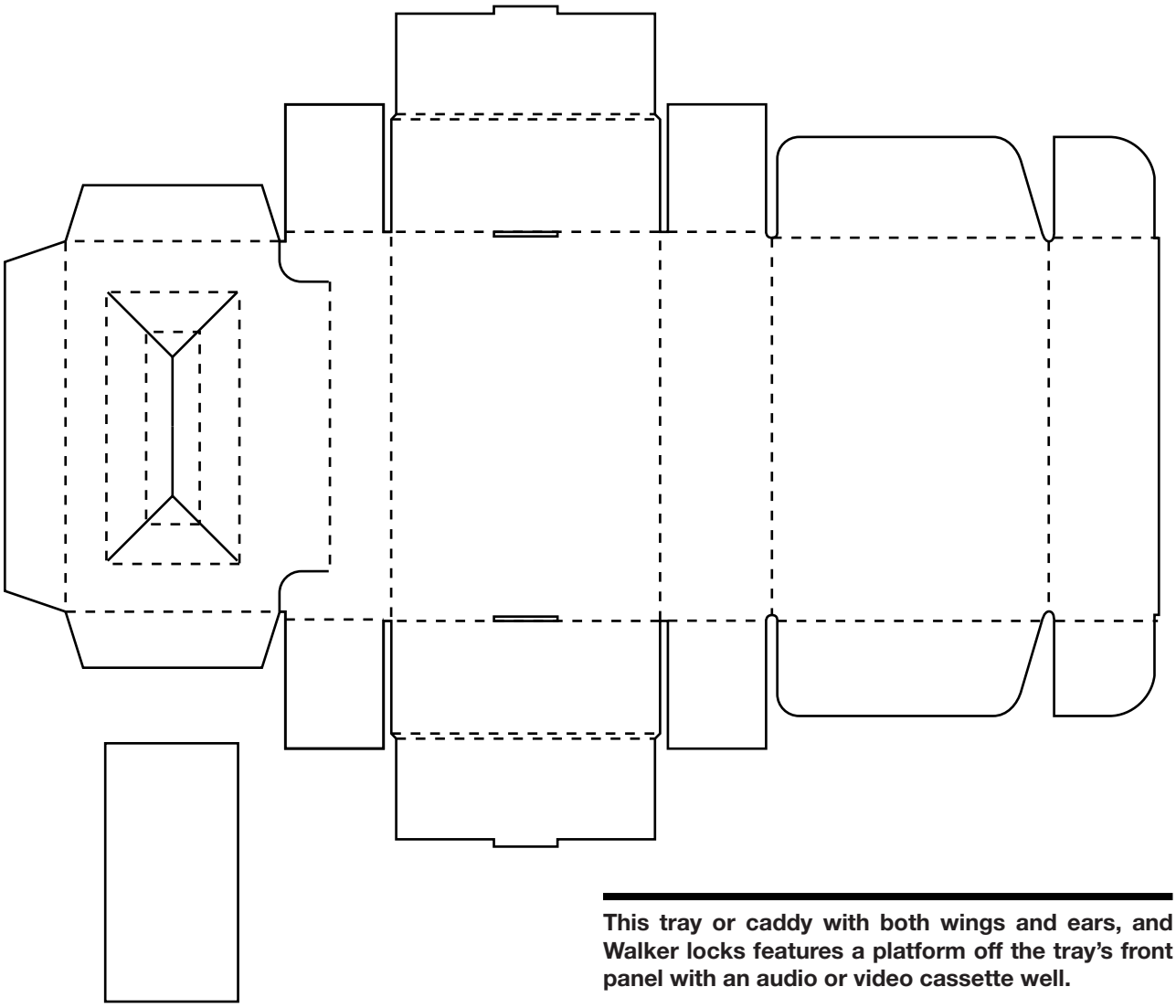


SELF-LOCKING TRAY WITH DOUBLE SIDE WALLS AND TEAR-AWAY FRONT PANEL

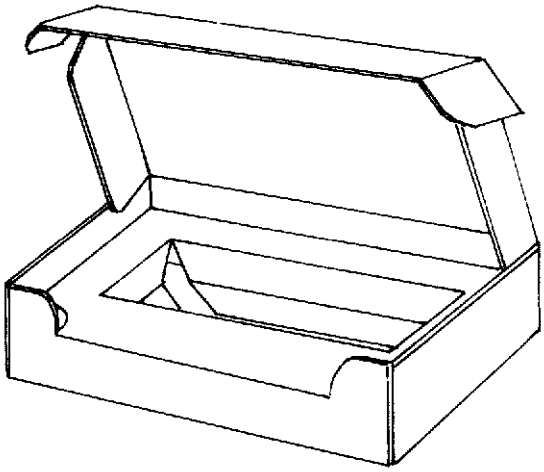




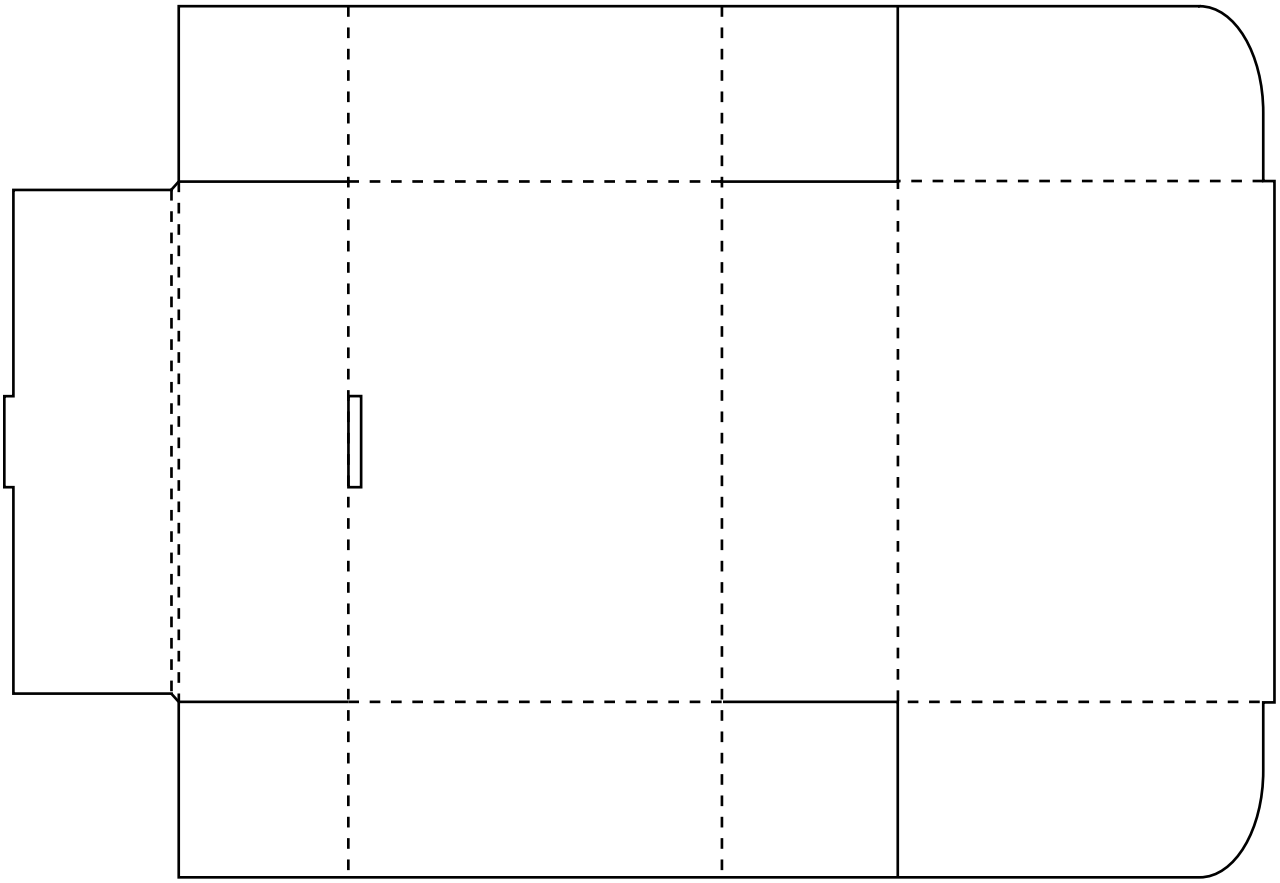


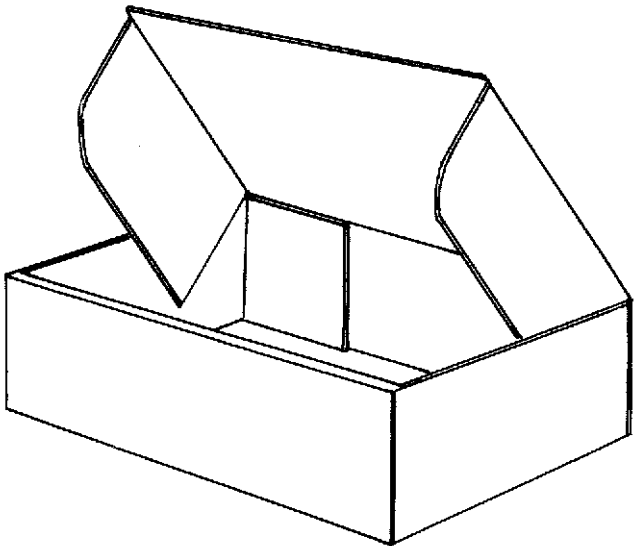


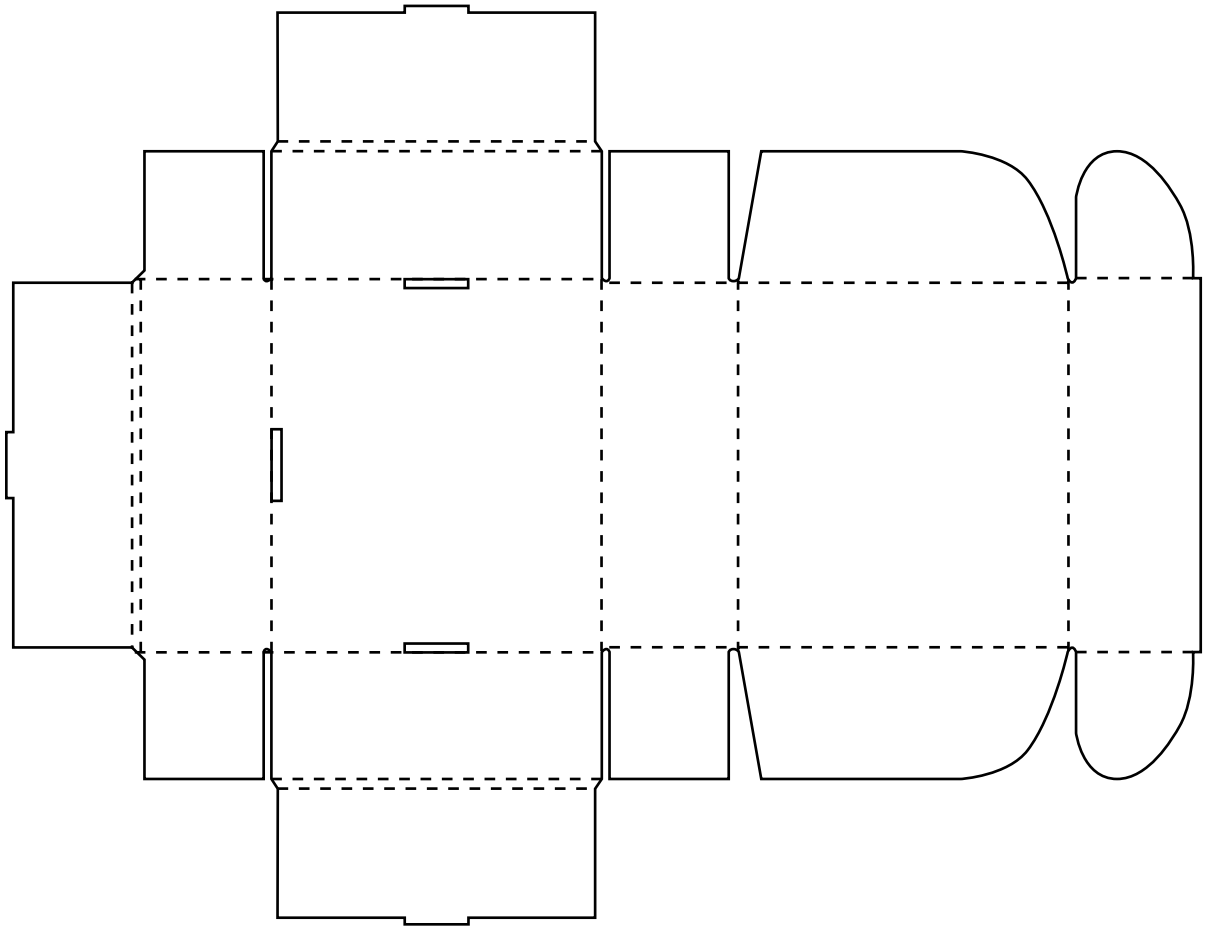
This tray or caddy with both wings and ears, and Walker locks features a platform off the tray's front panel with an audio or video cassette well.

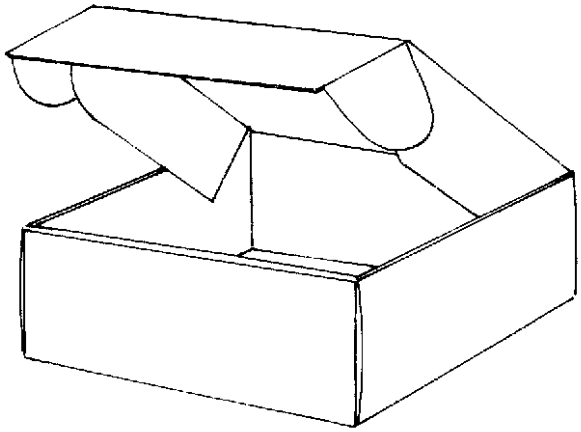


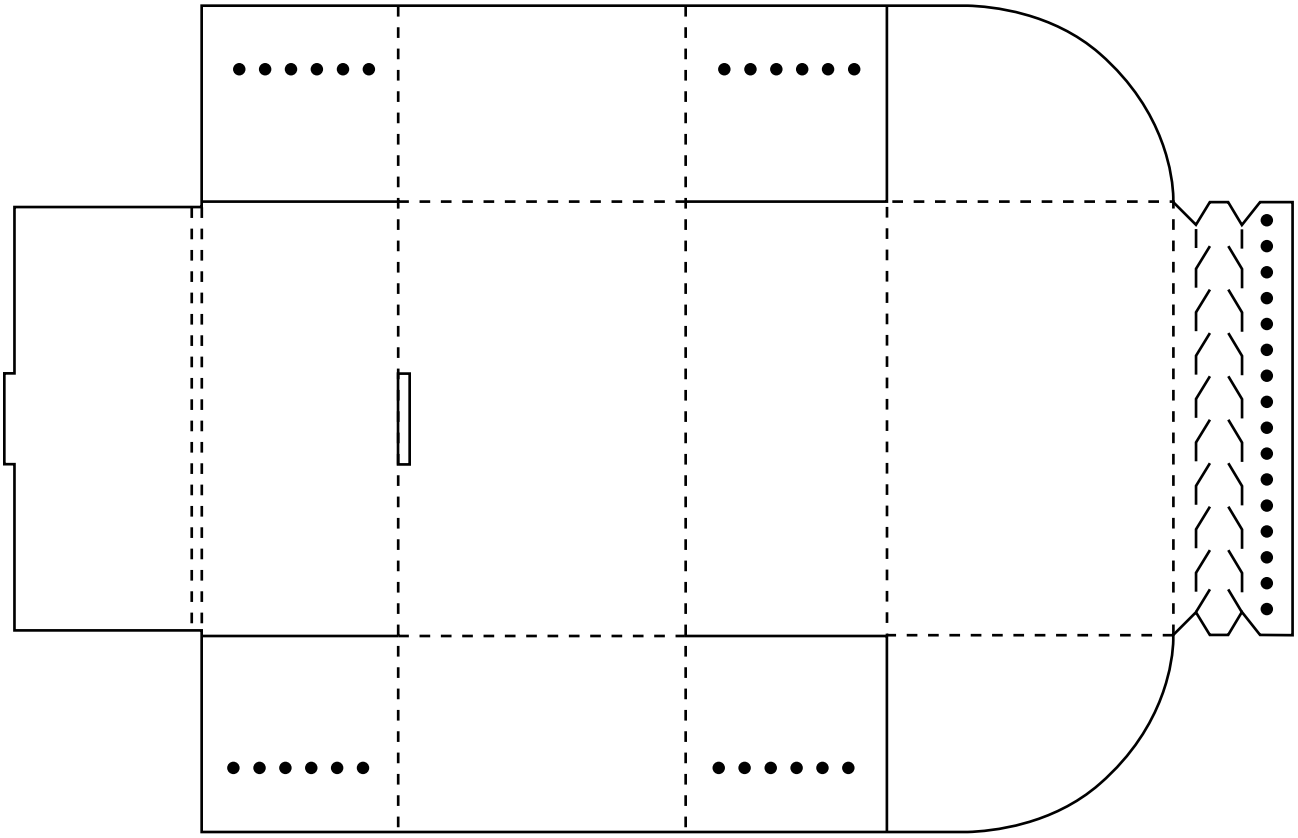
A pad cut from the waste of the sheet can provide a floor for the cassette well.

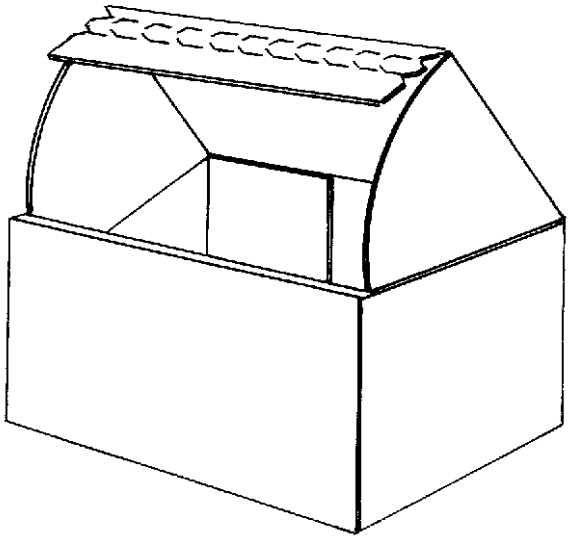


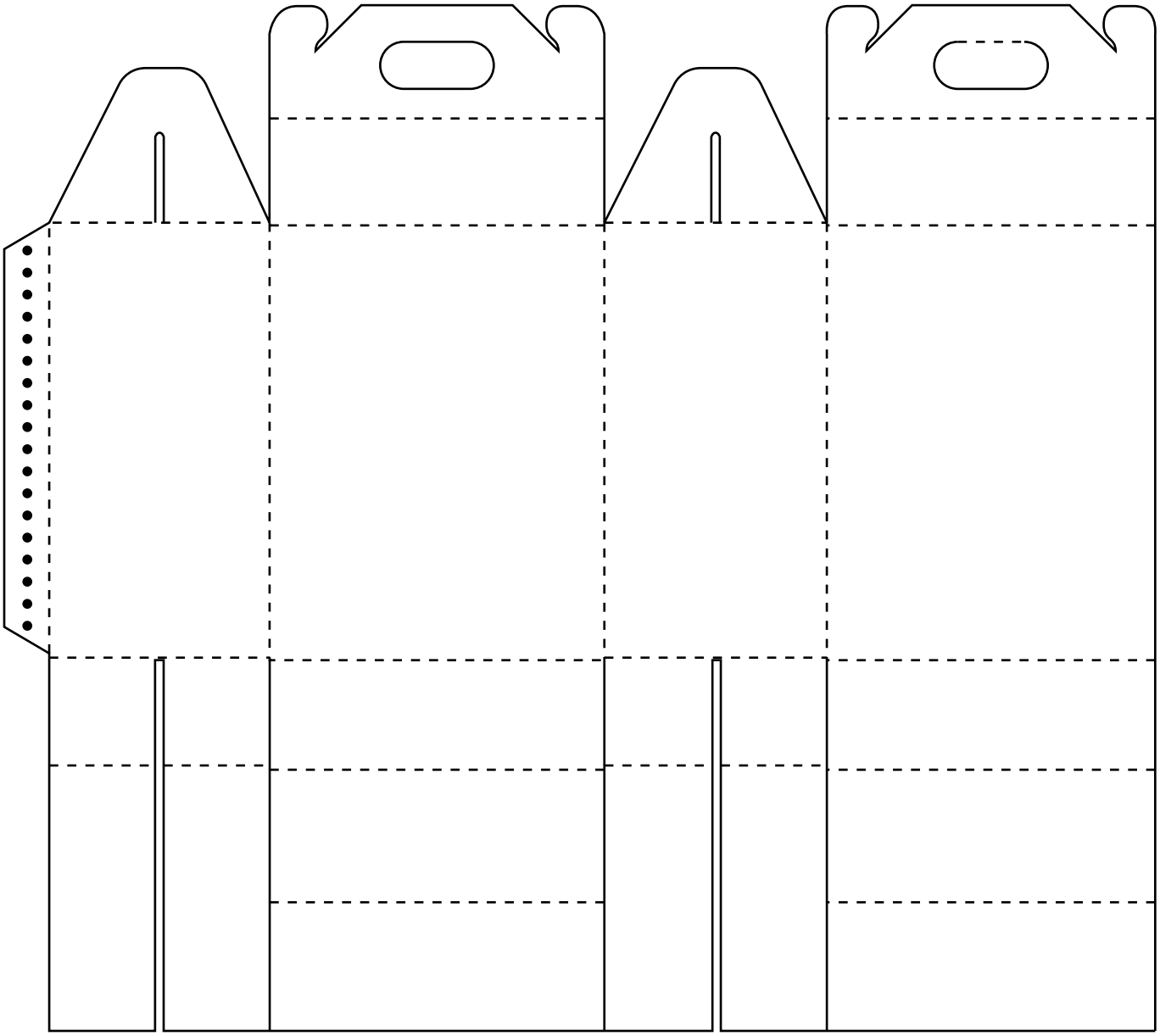


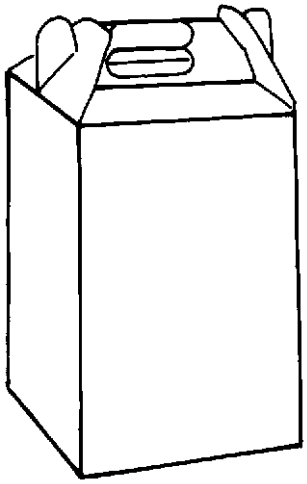


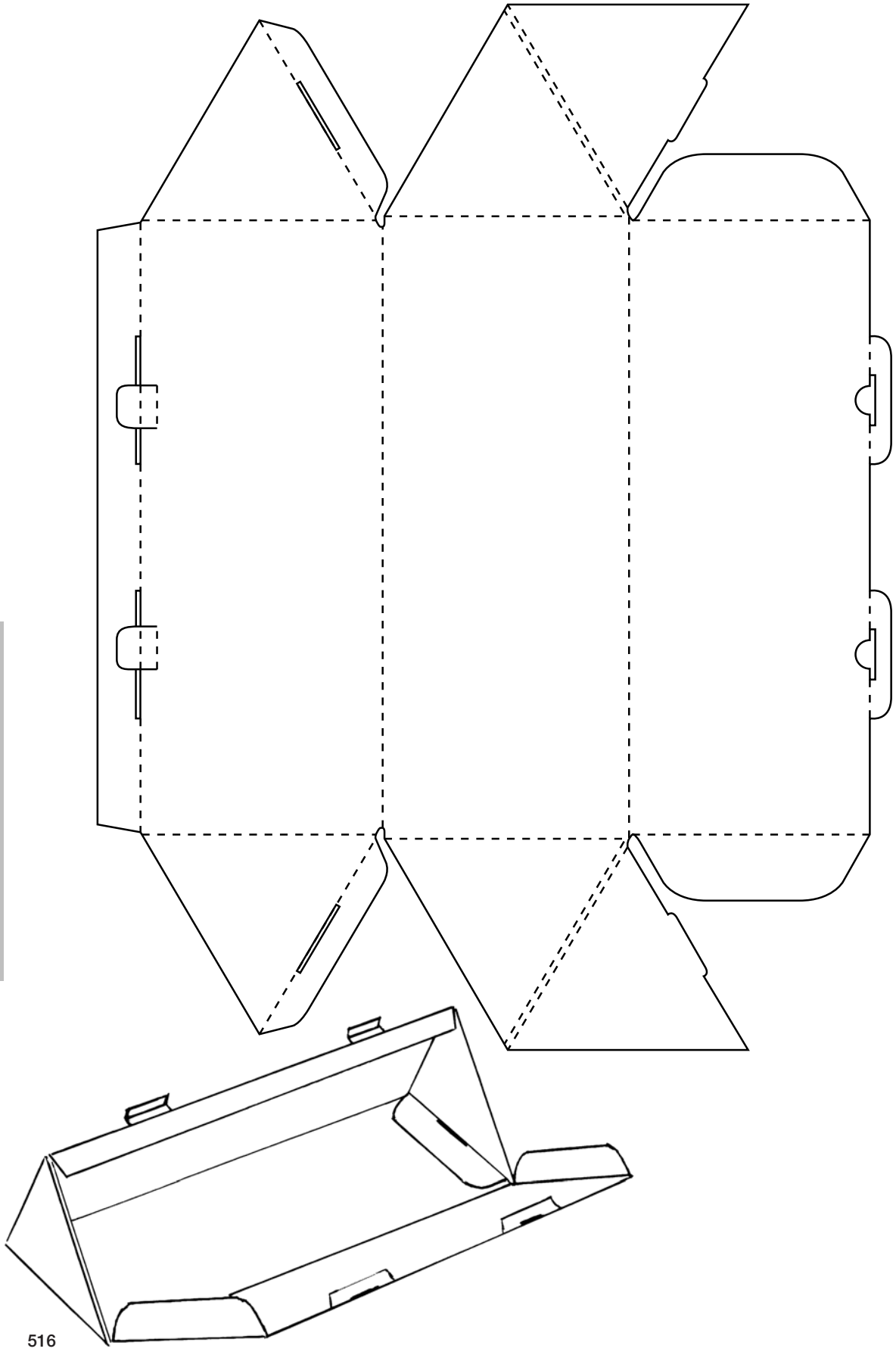


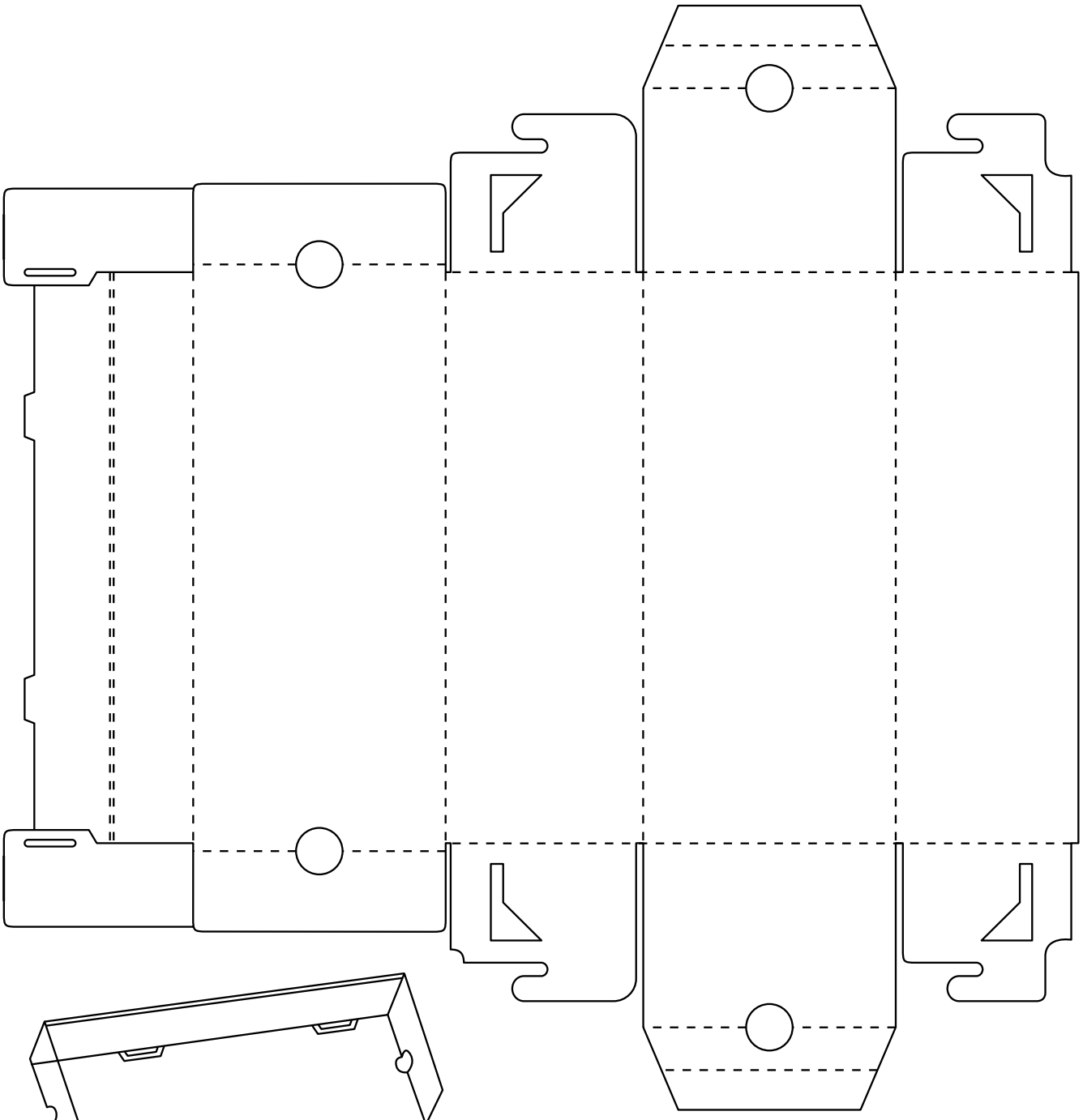


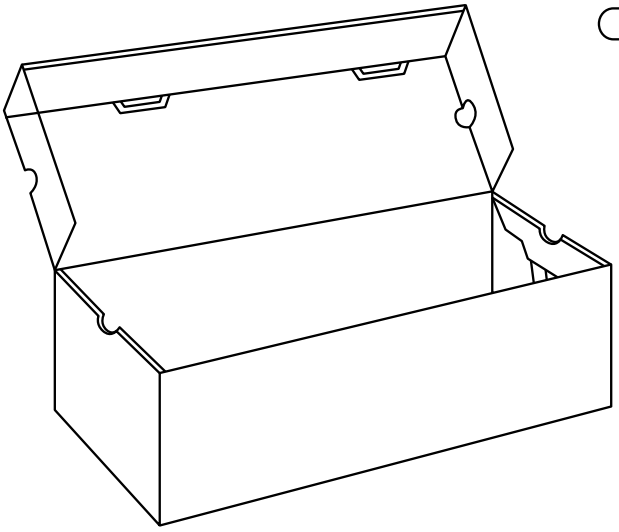




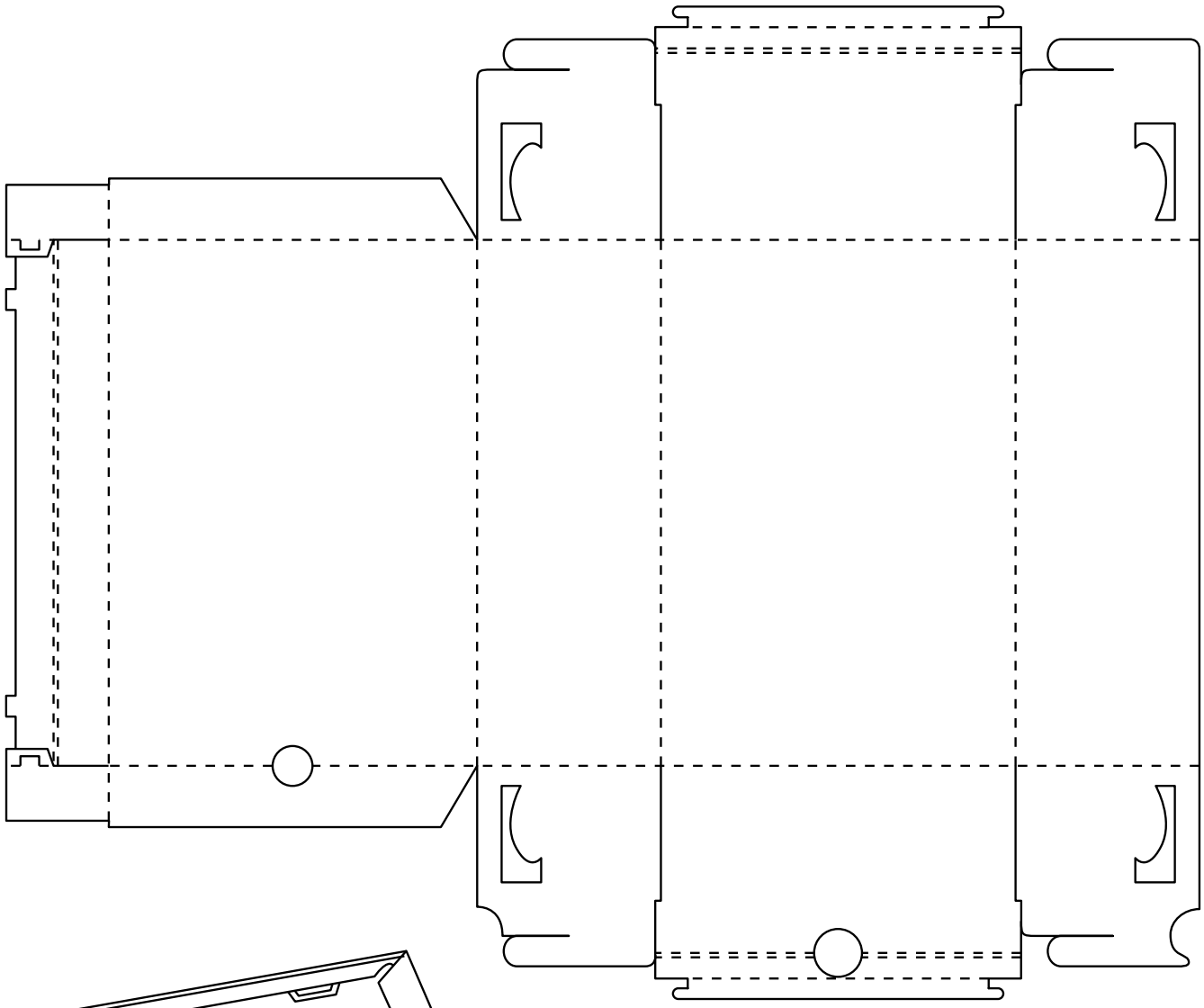


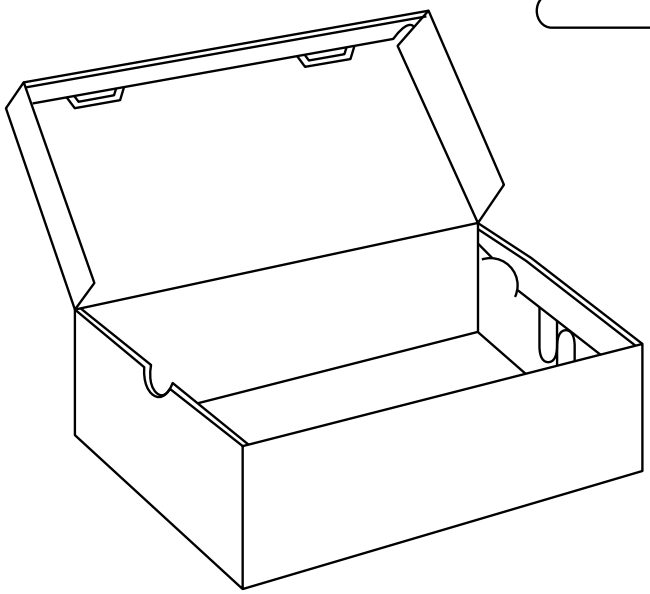


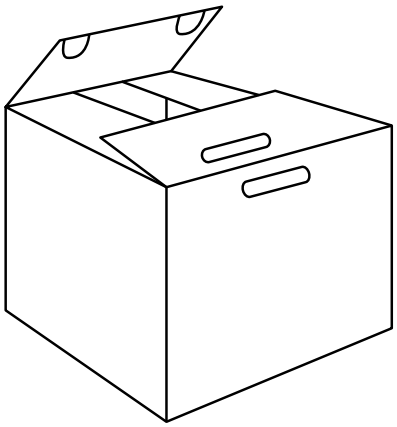


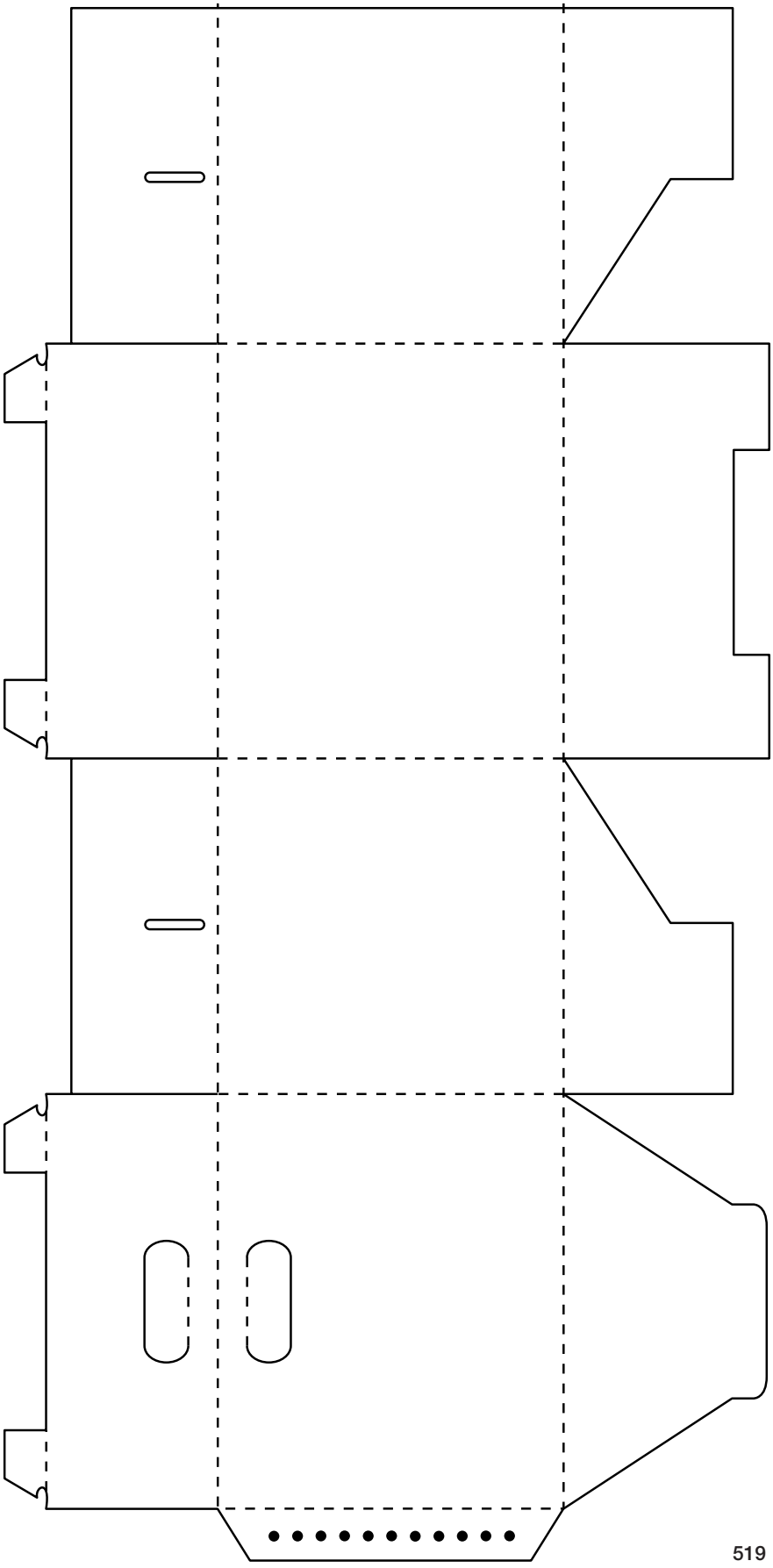


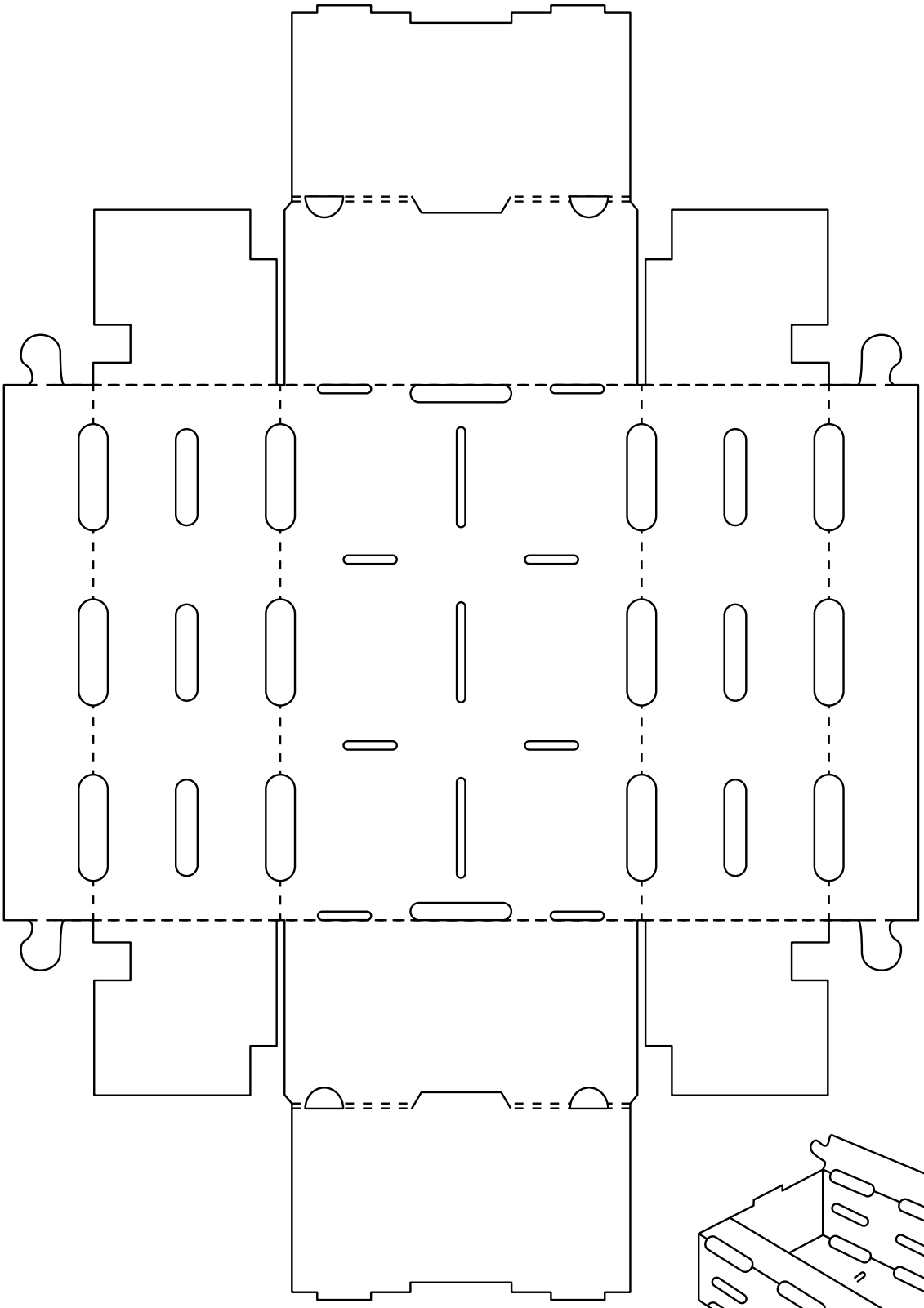
Note the unique corner treatment

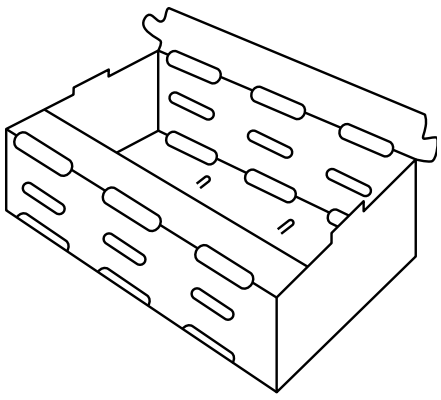


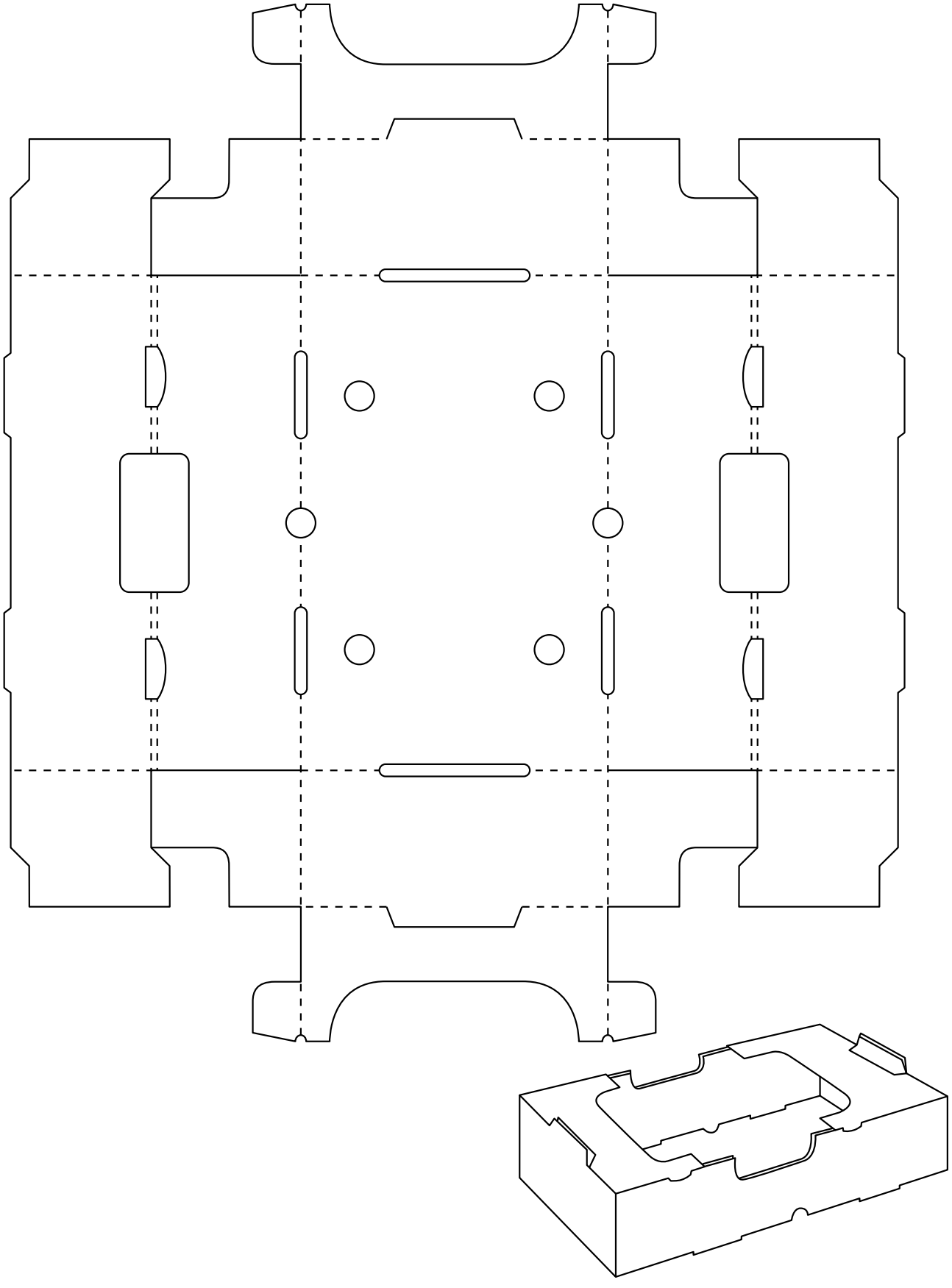


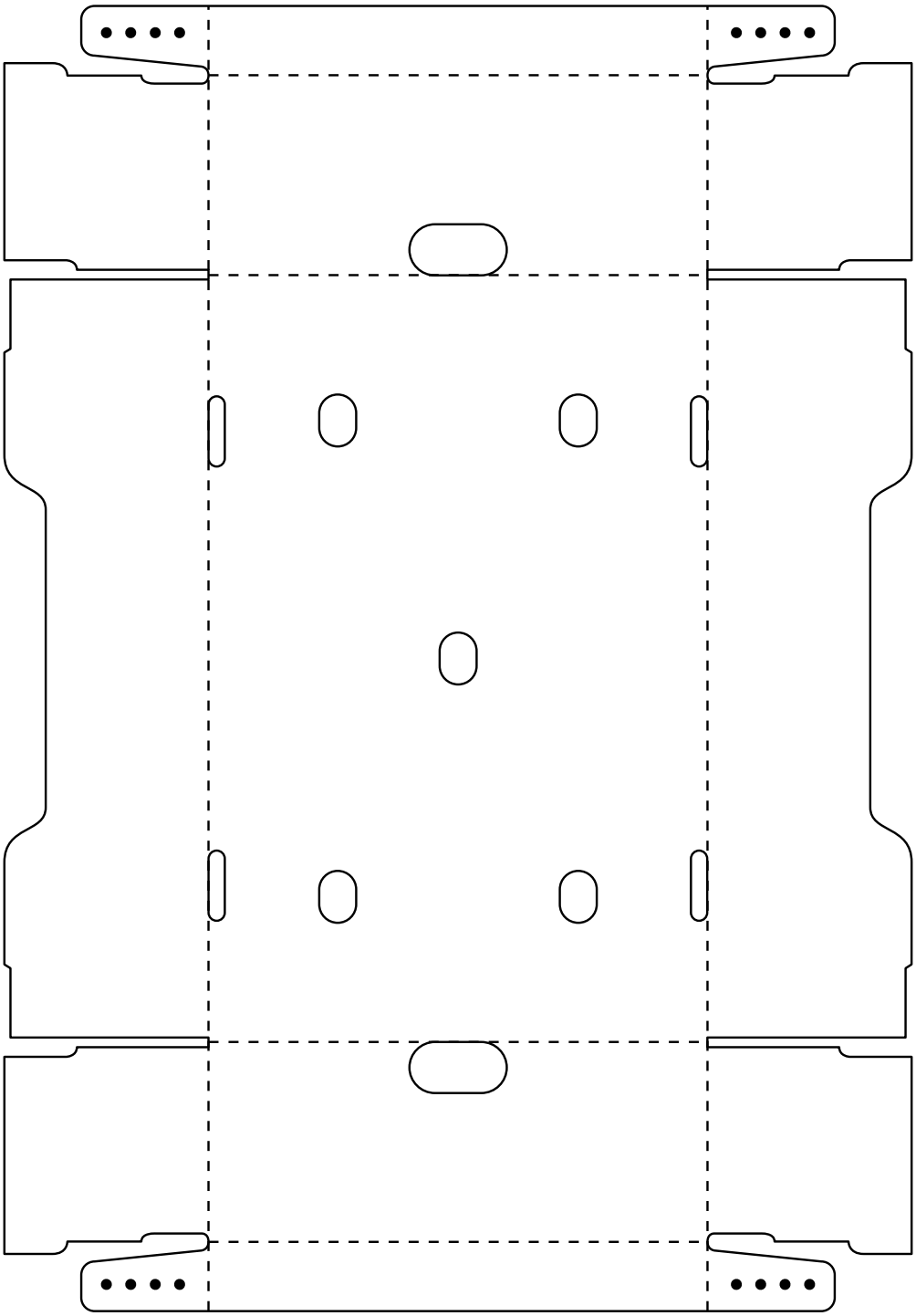


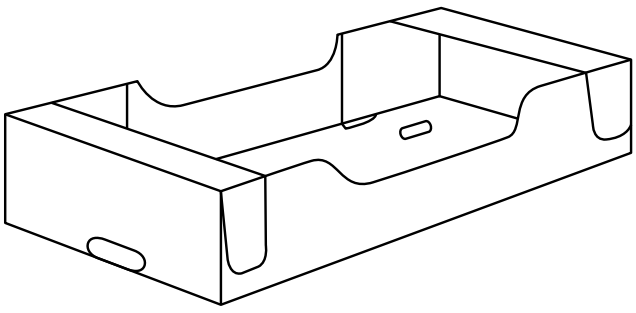


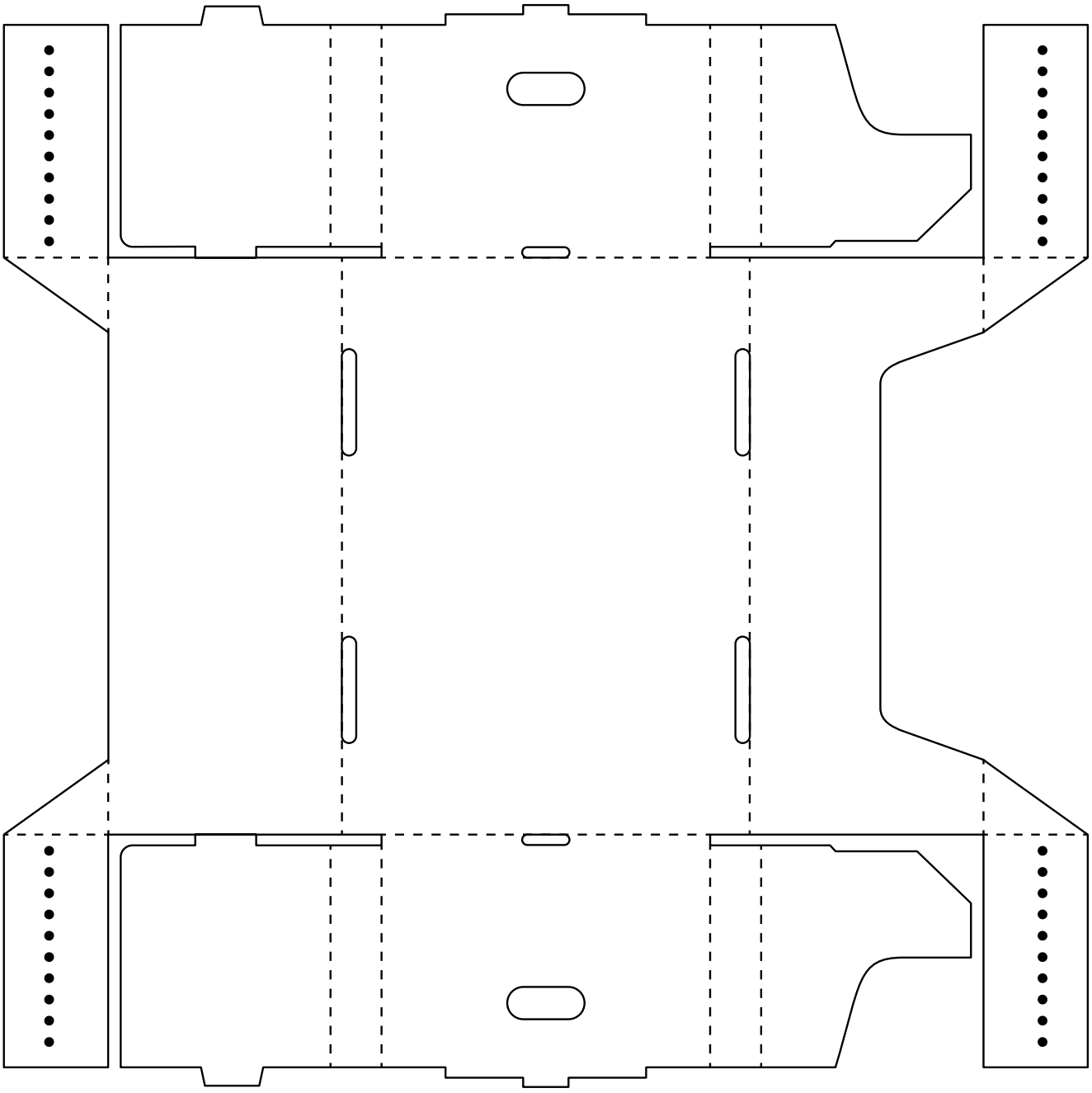




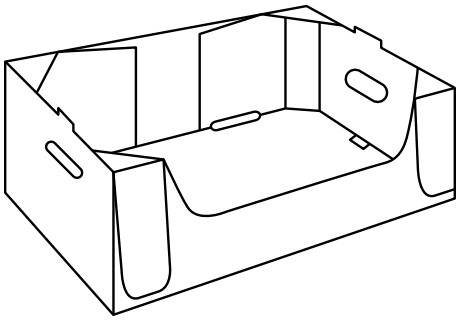


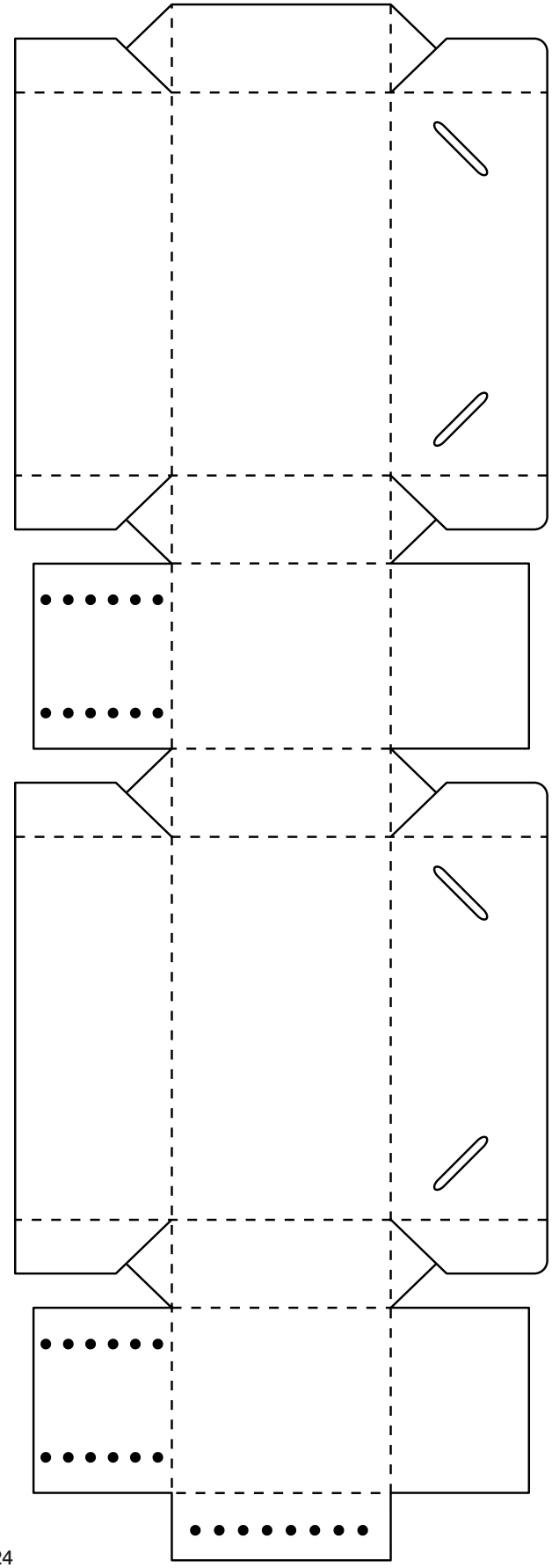


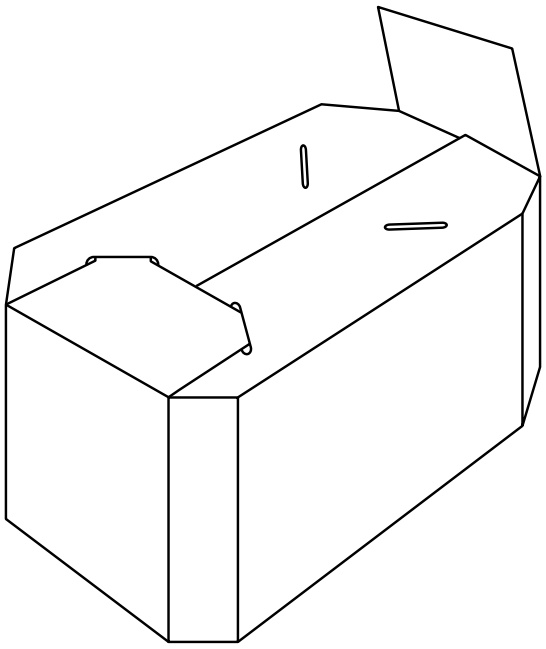


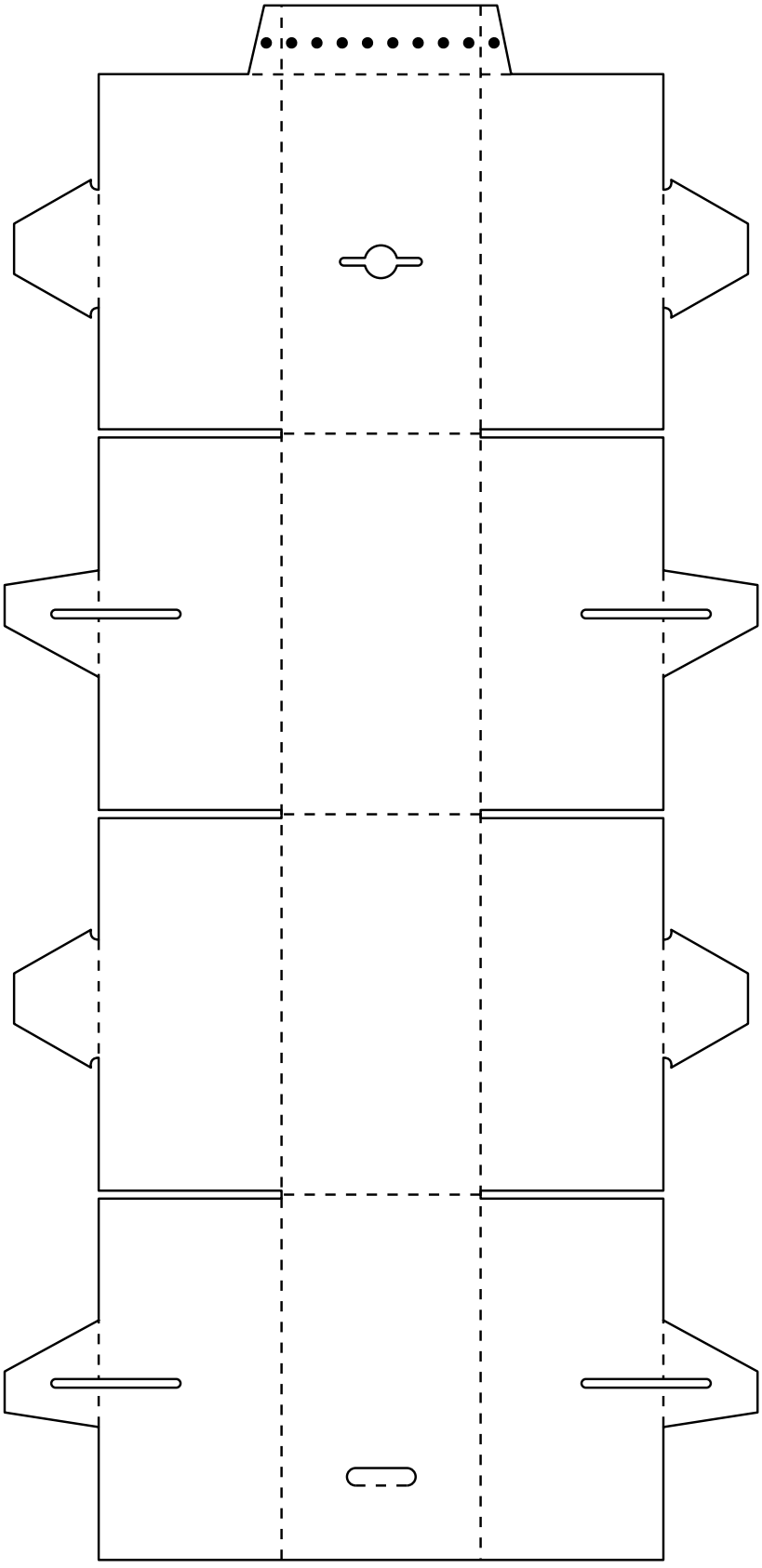


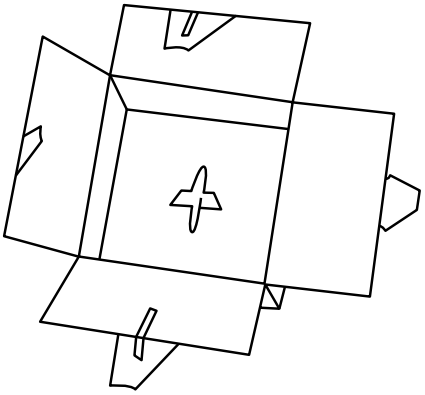
Note the projecting stubs above the handle openings to facilitate stacking the cartons.





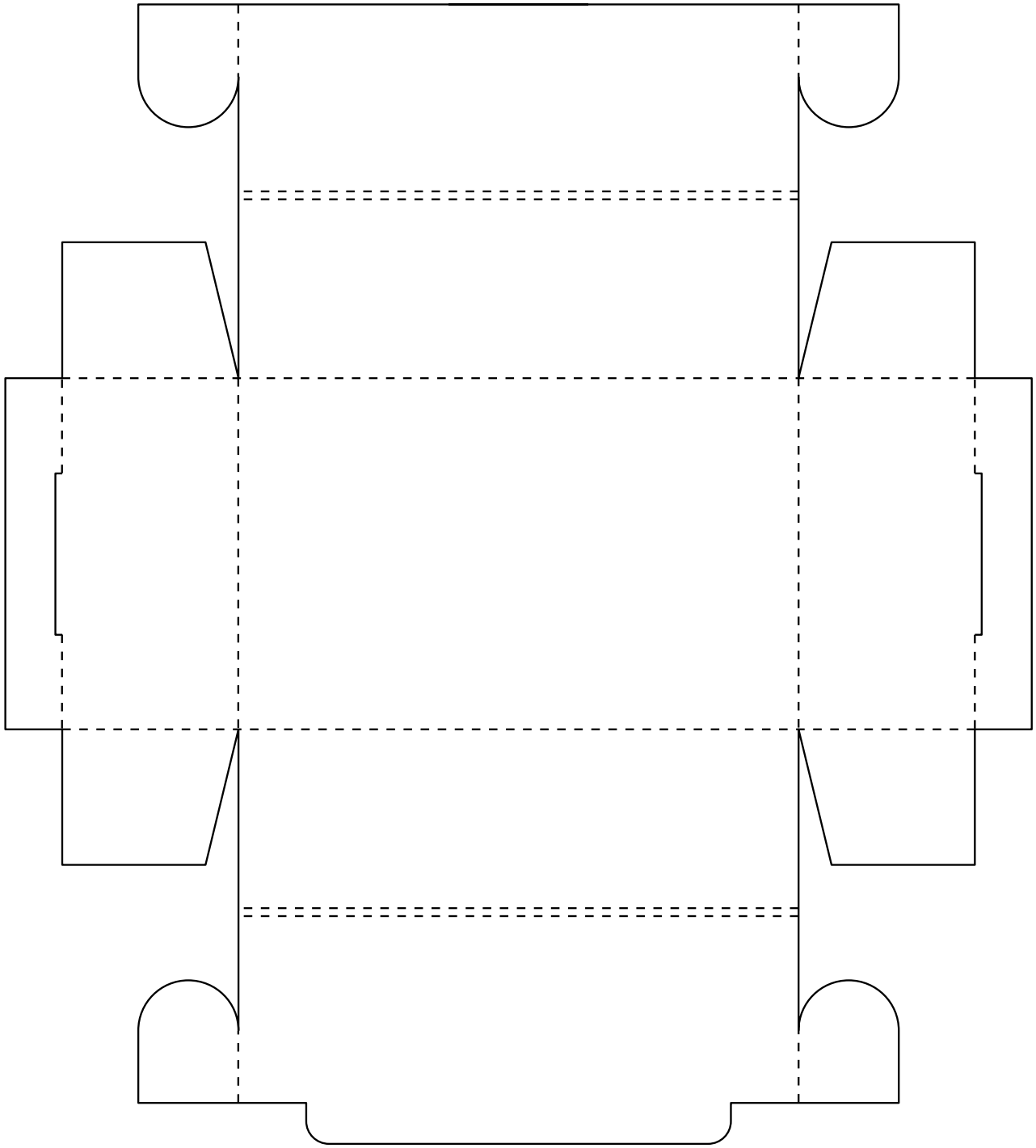


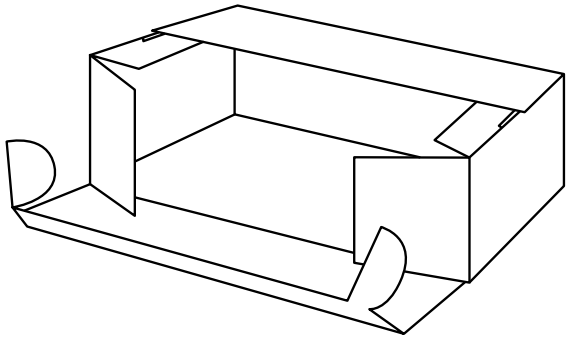


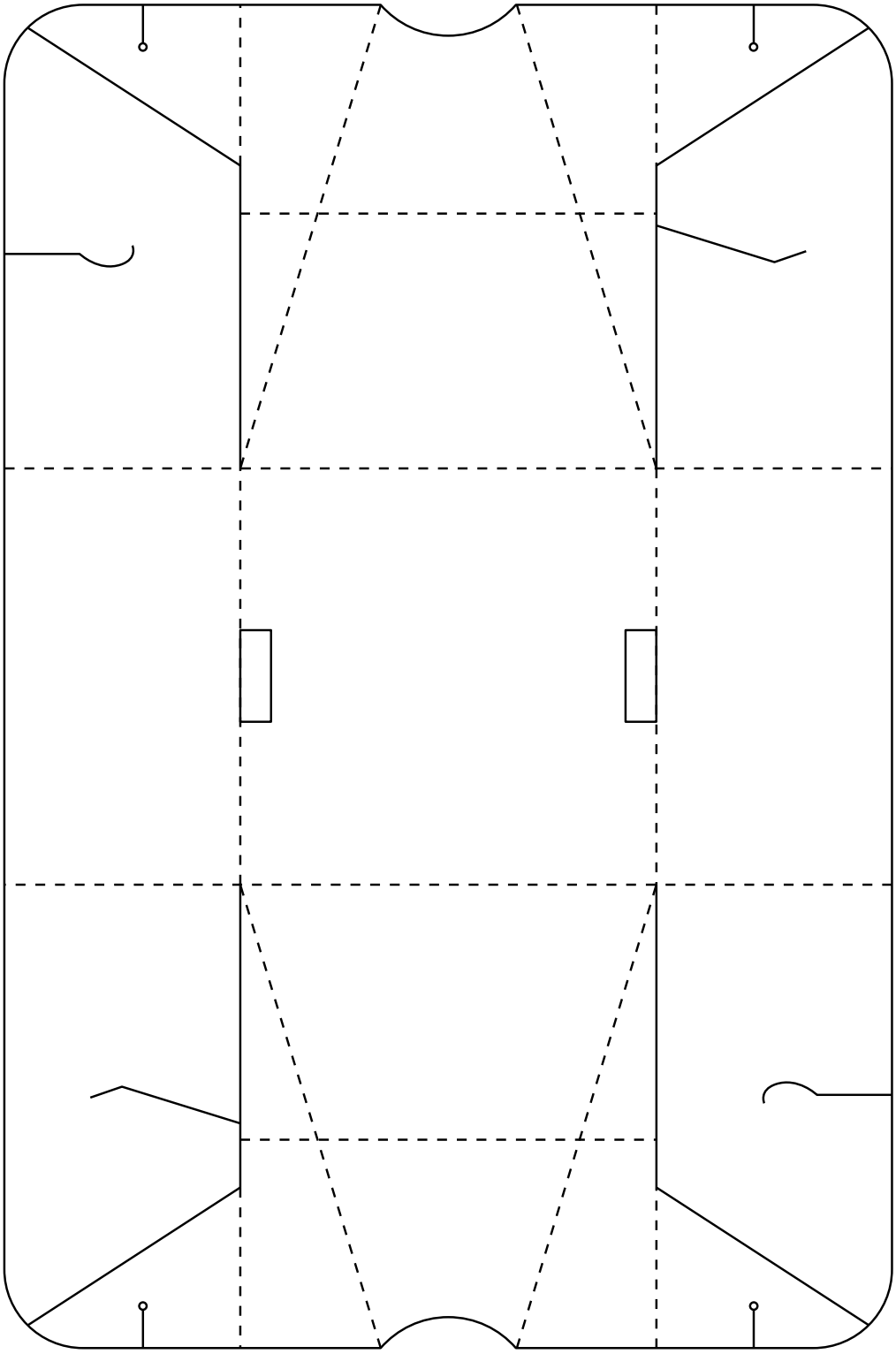


The triangular projections for an axis for the cable spool when the box is closed.

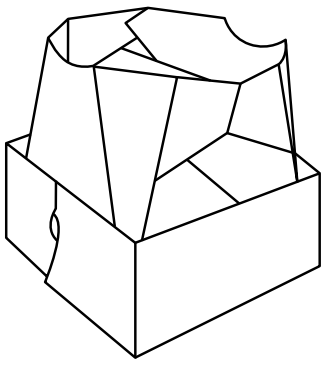
The hole serves as the cable dispenser.

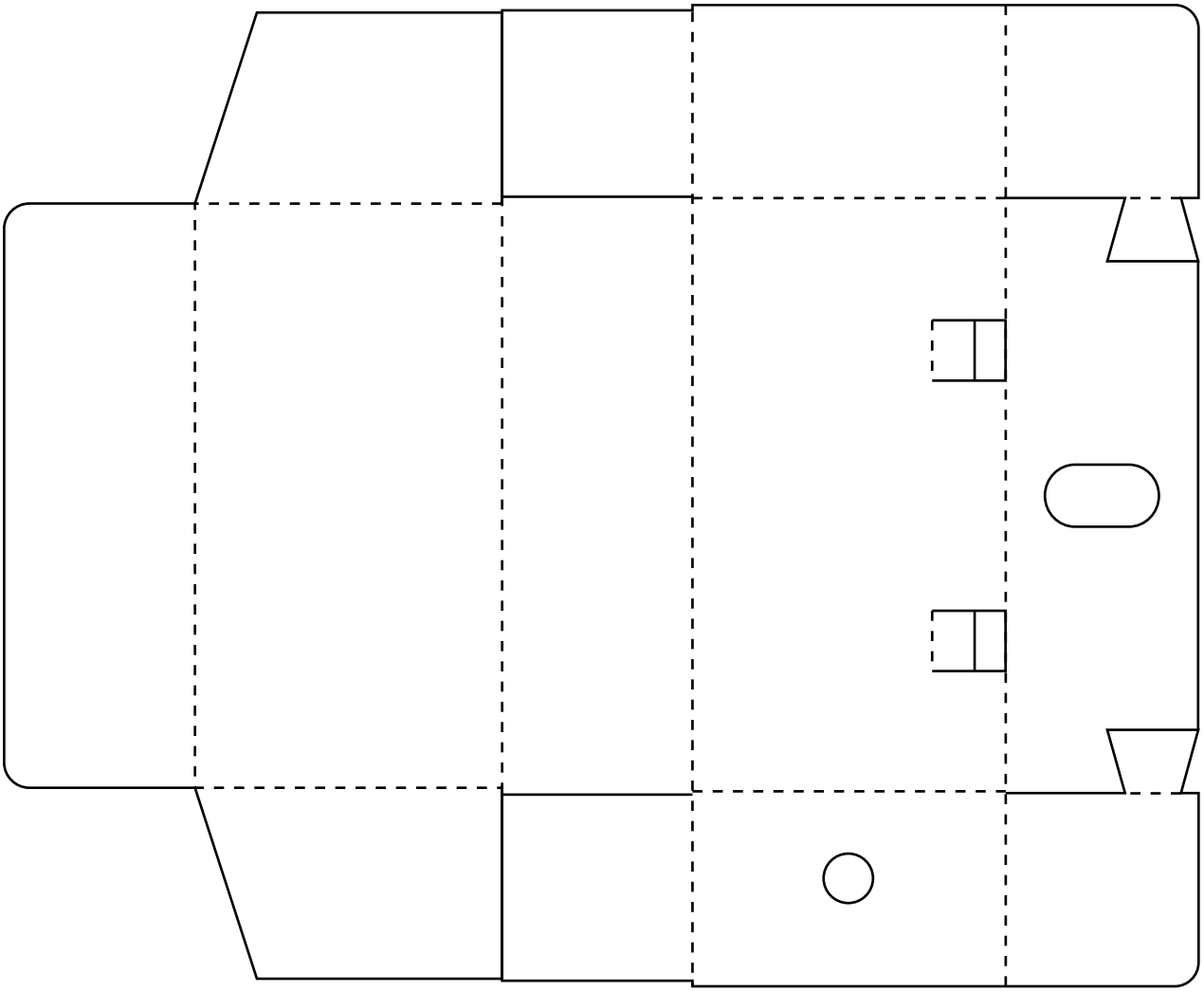


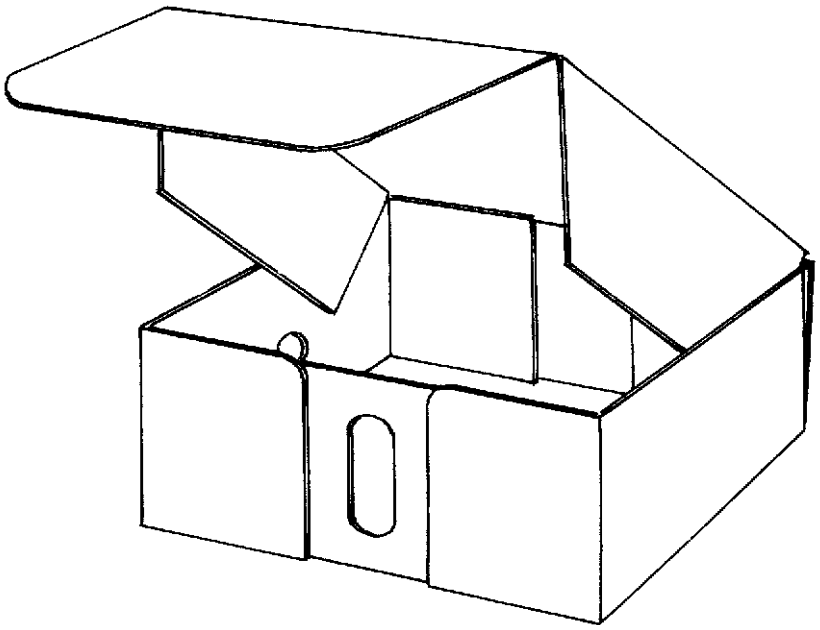


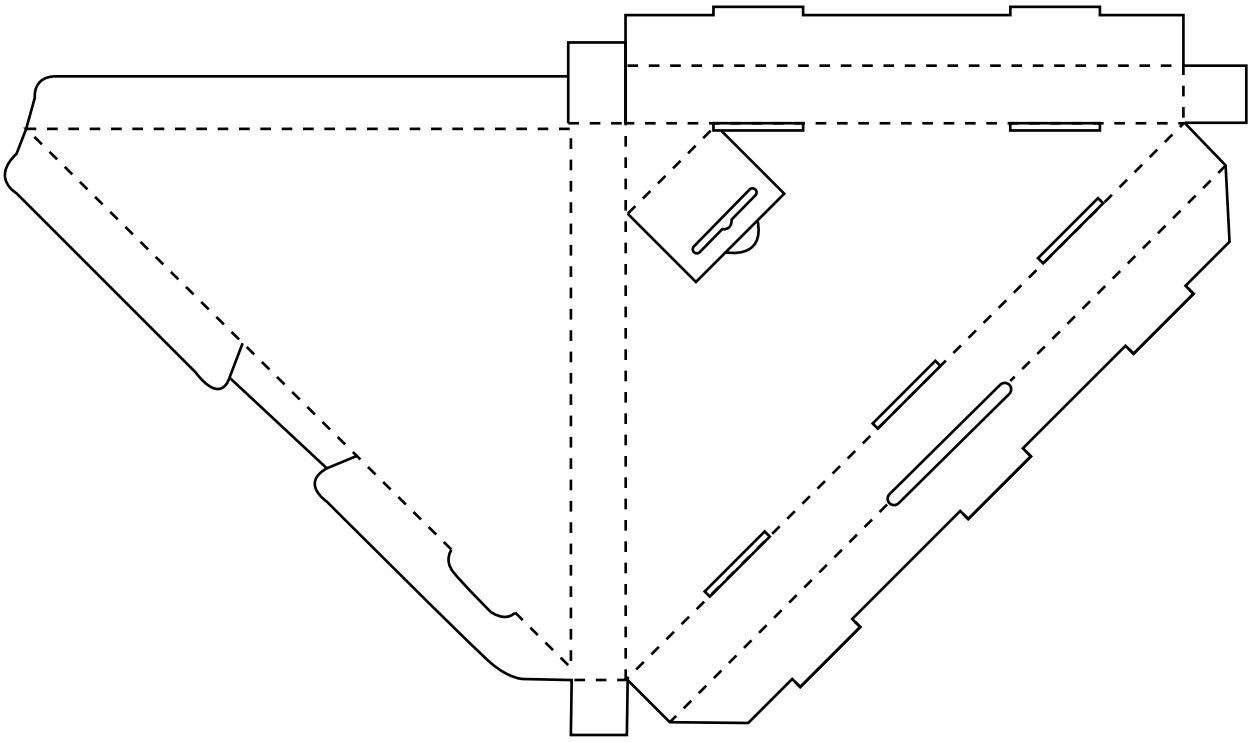


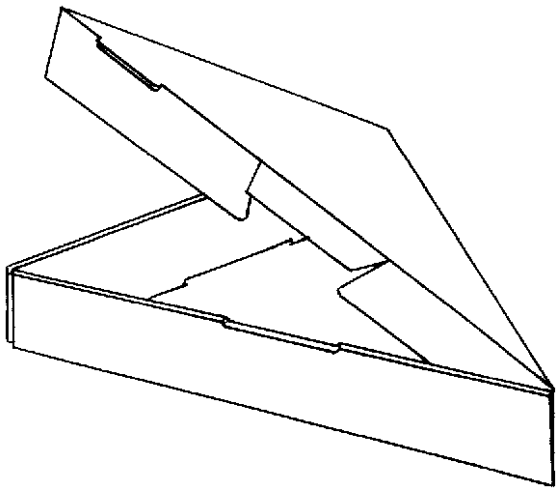
This corrugated structure wraps around a glass flower vase.

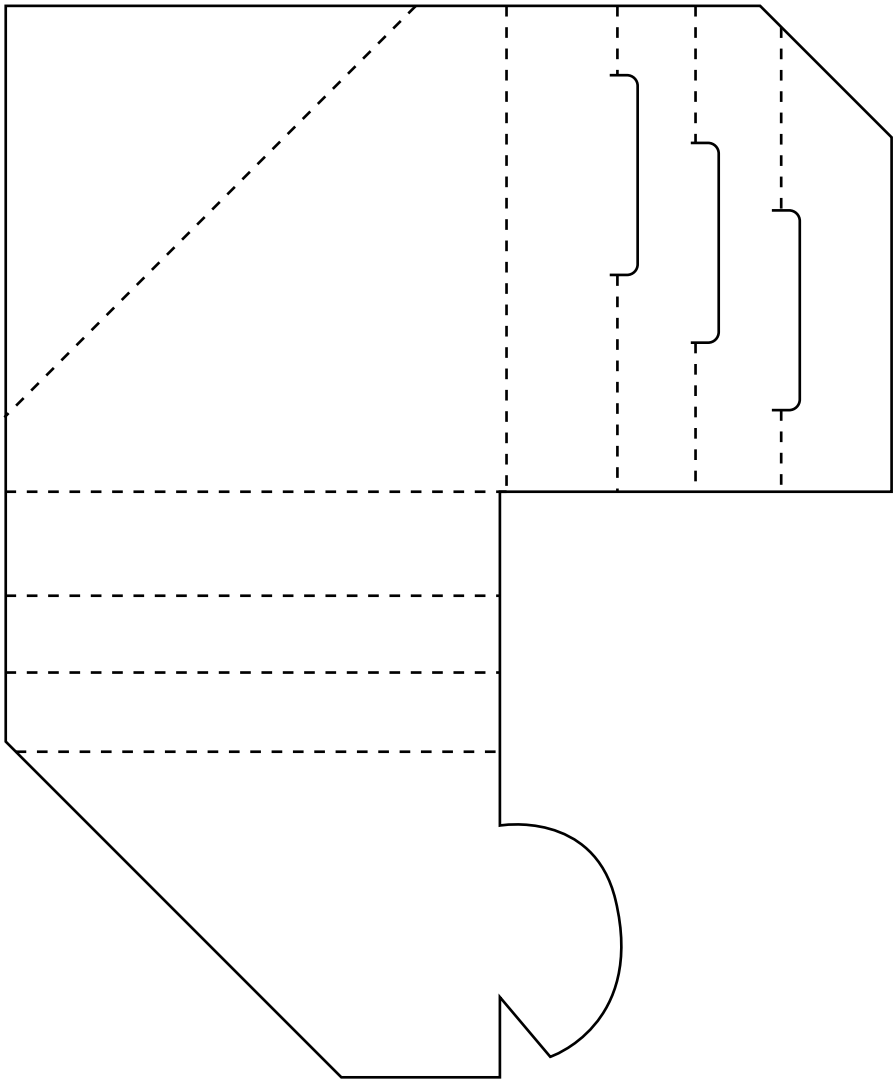


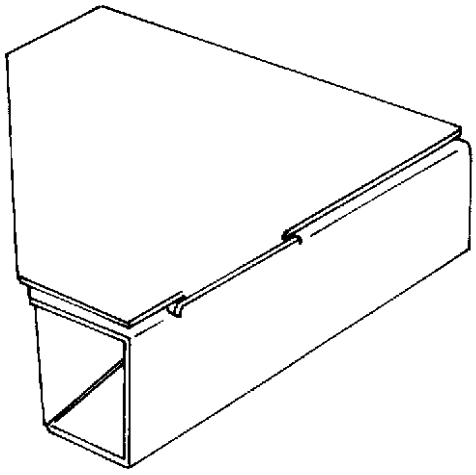






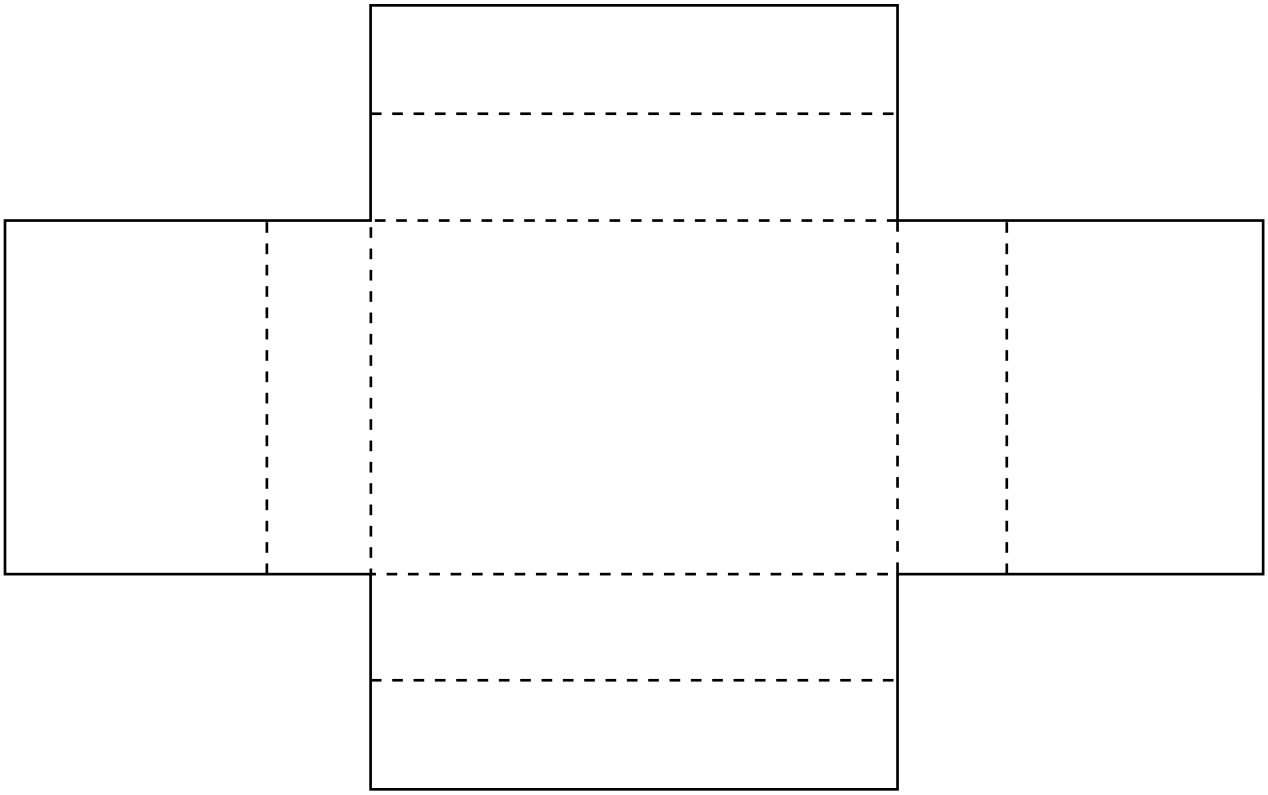


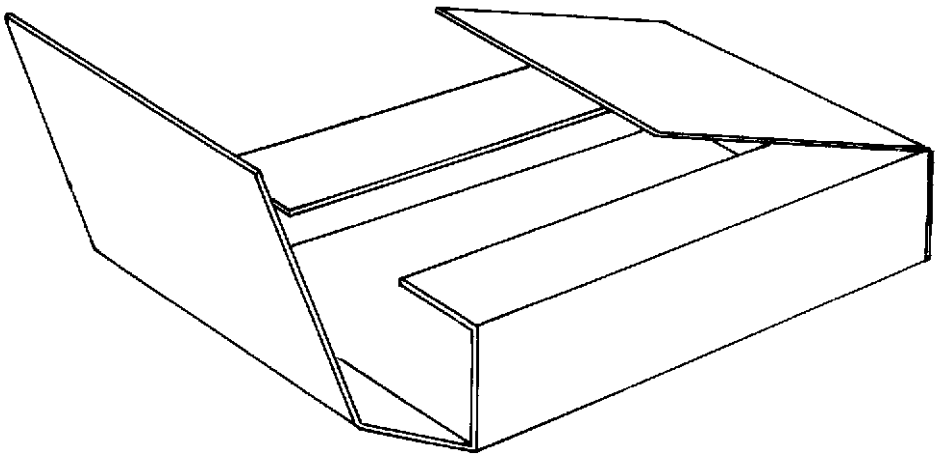


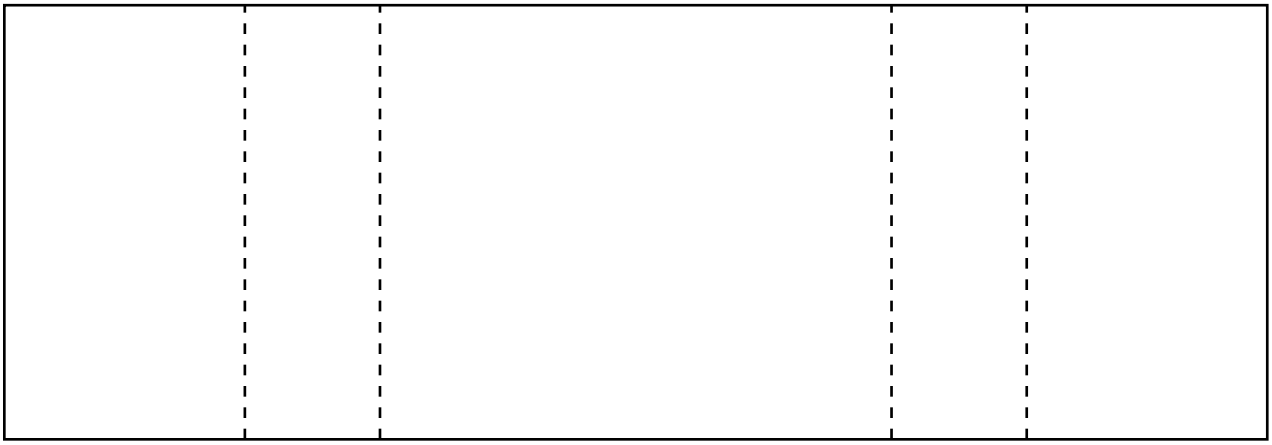


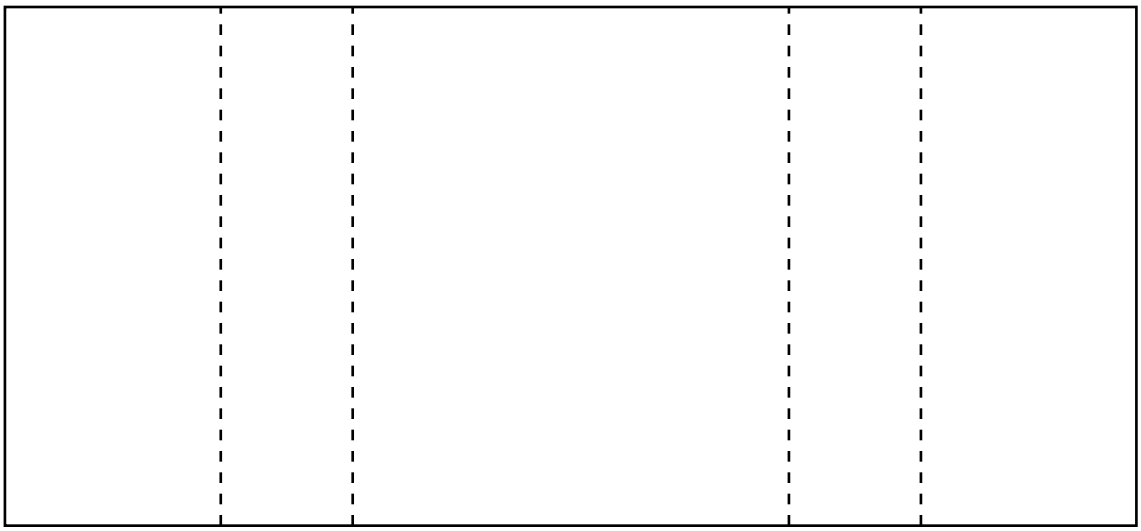
This protective frame corner is adjustable to three different frame thicknesses.

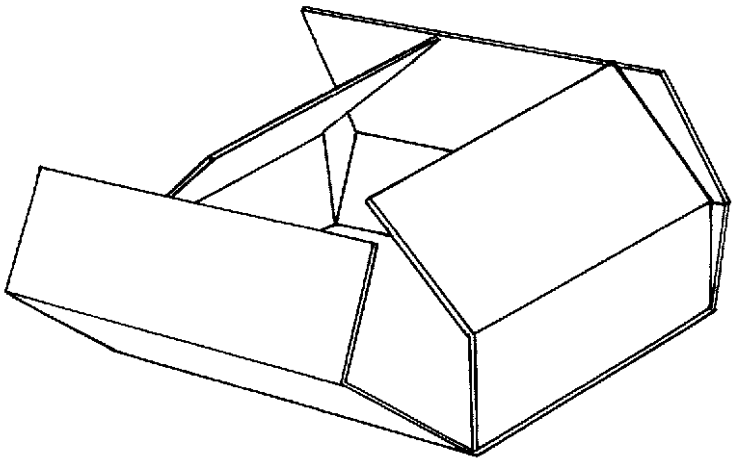
ONE-PIECE FOLDER
(Intl. Box Code 0401)

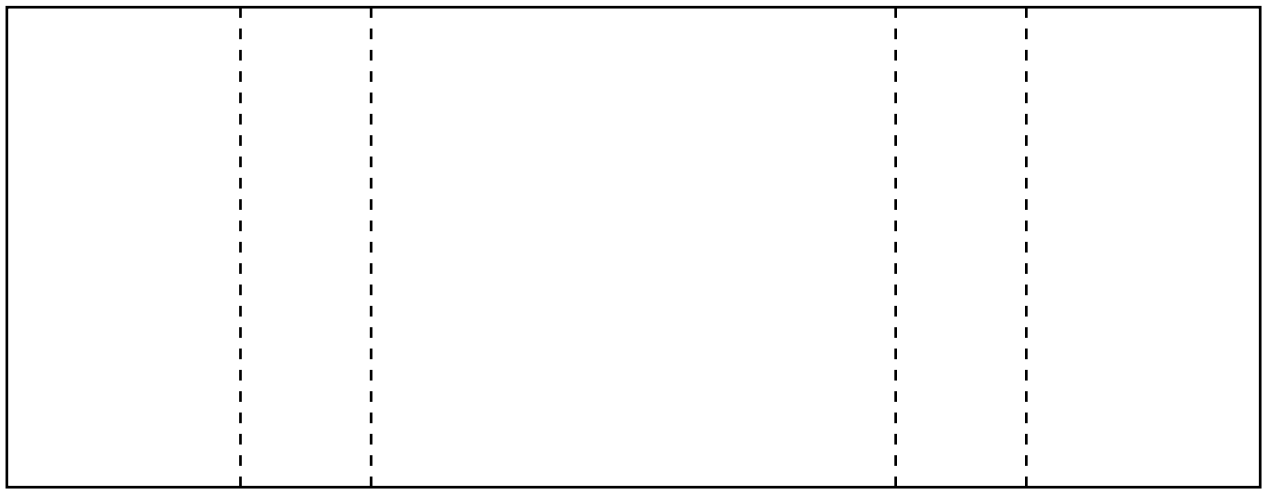


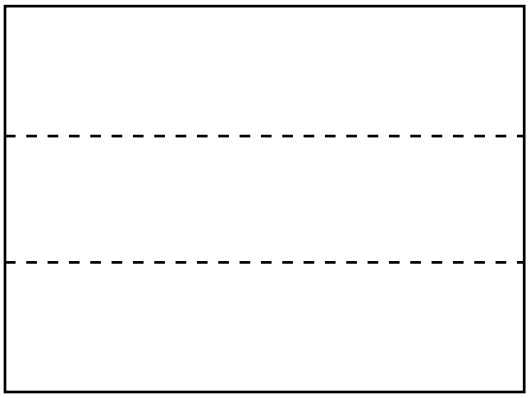


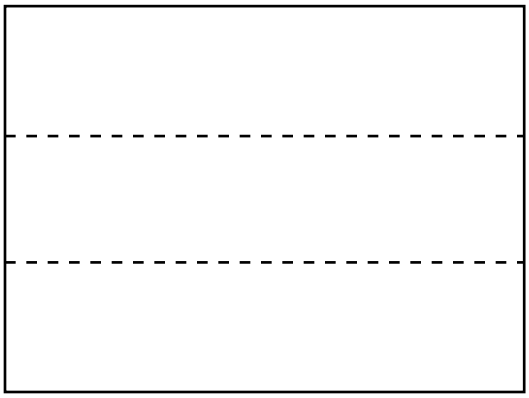


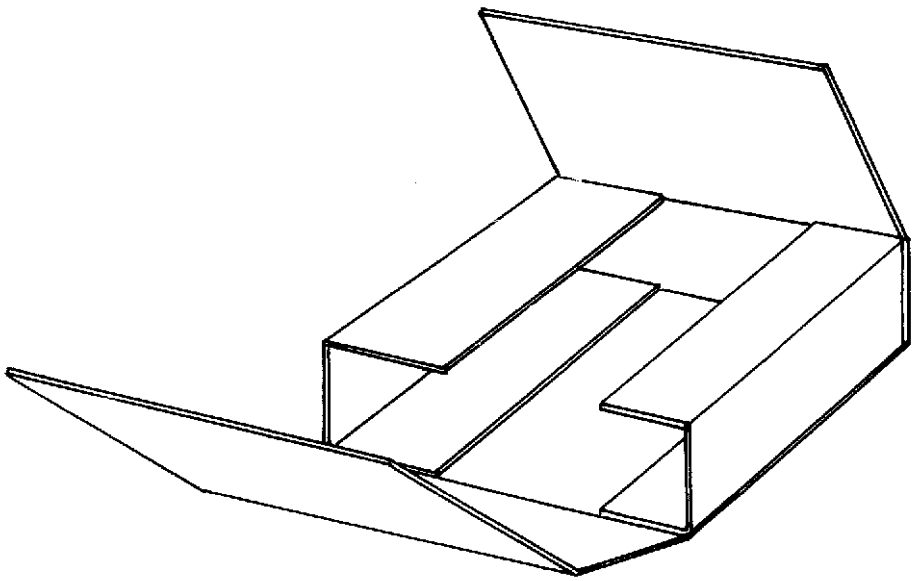


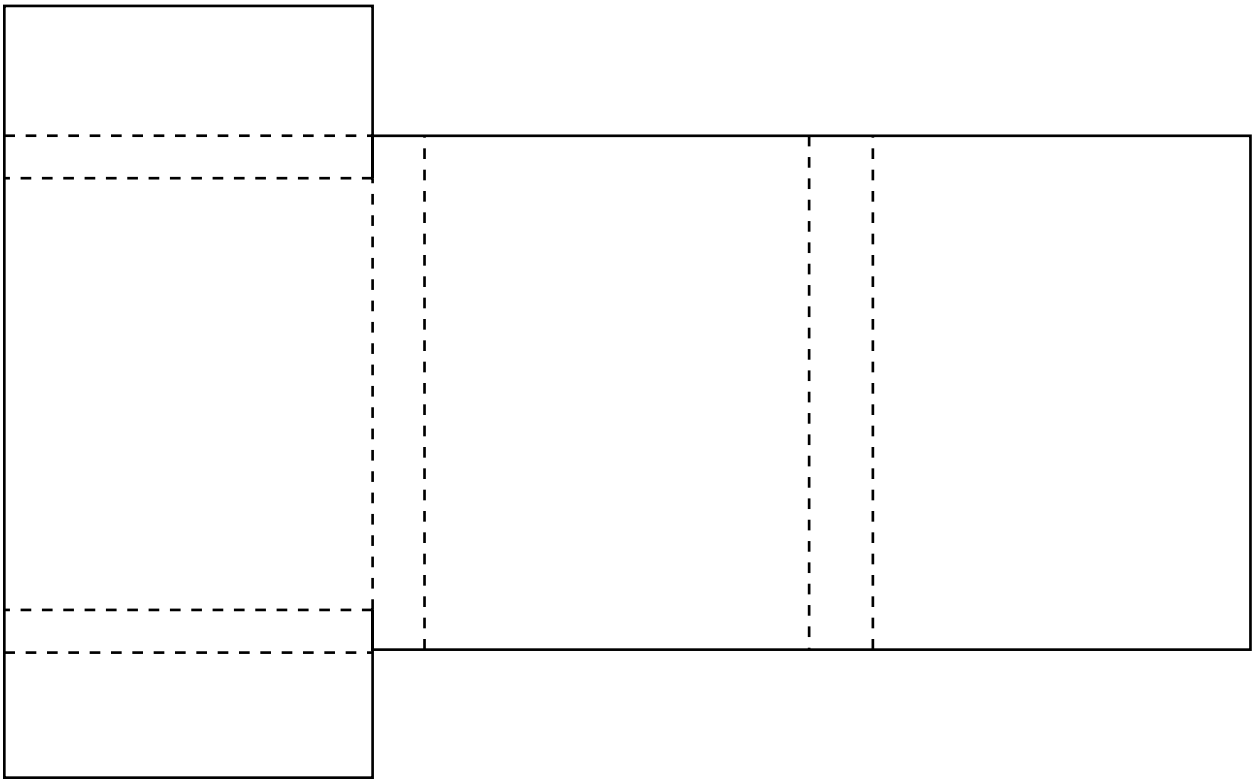


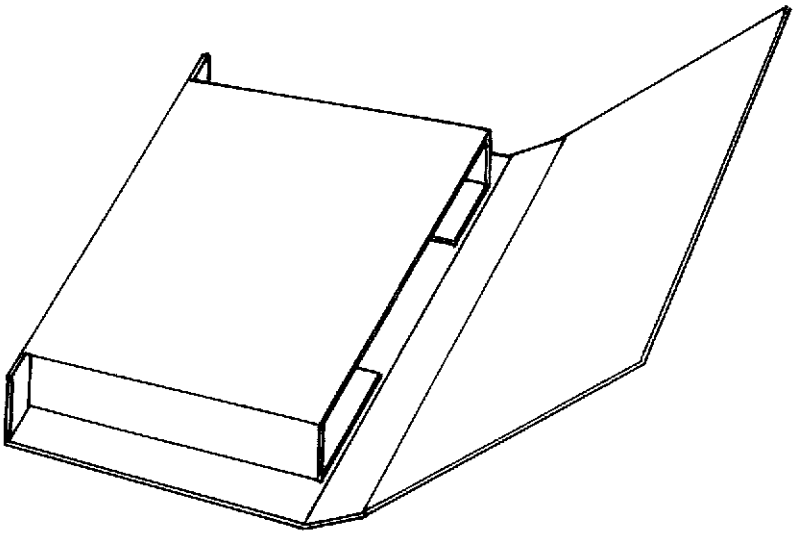


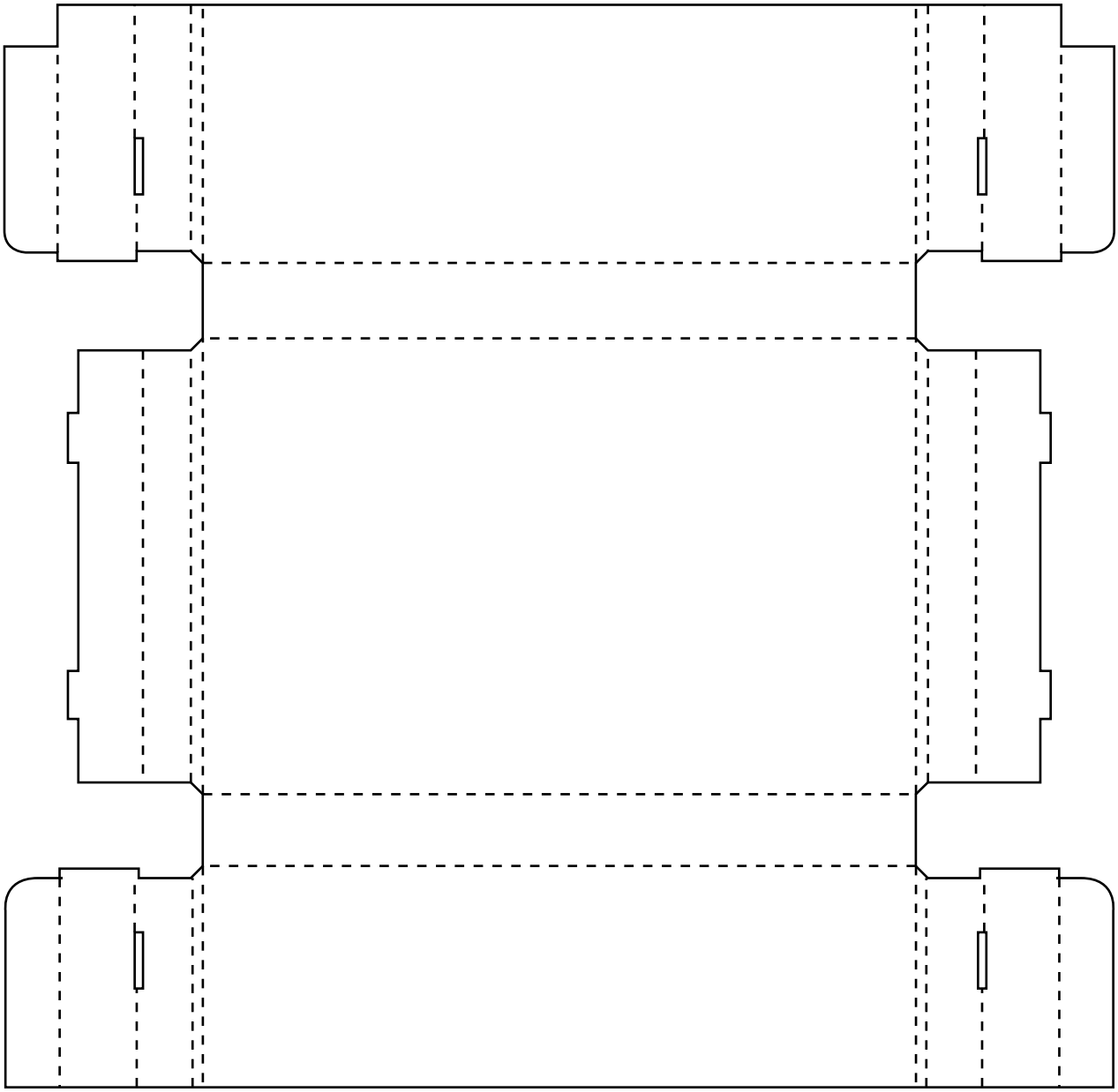


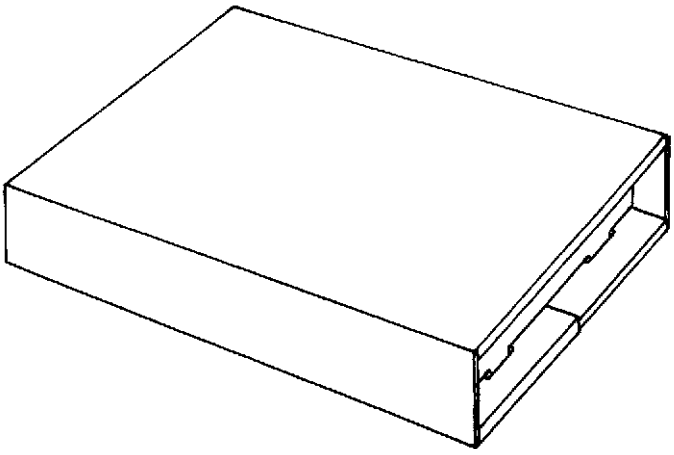


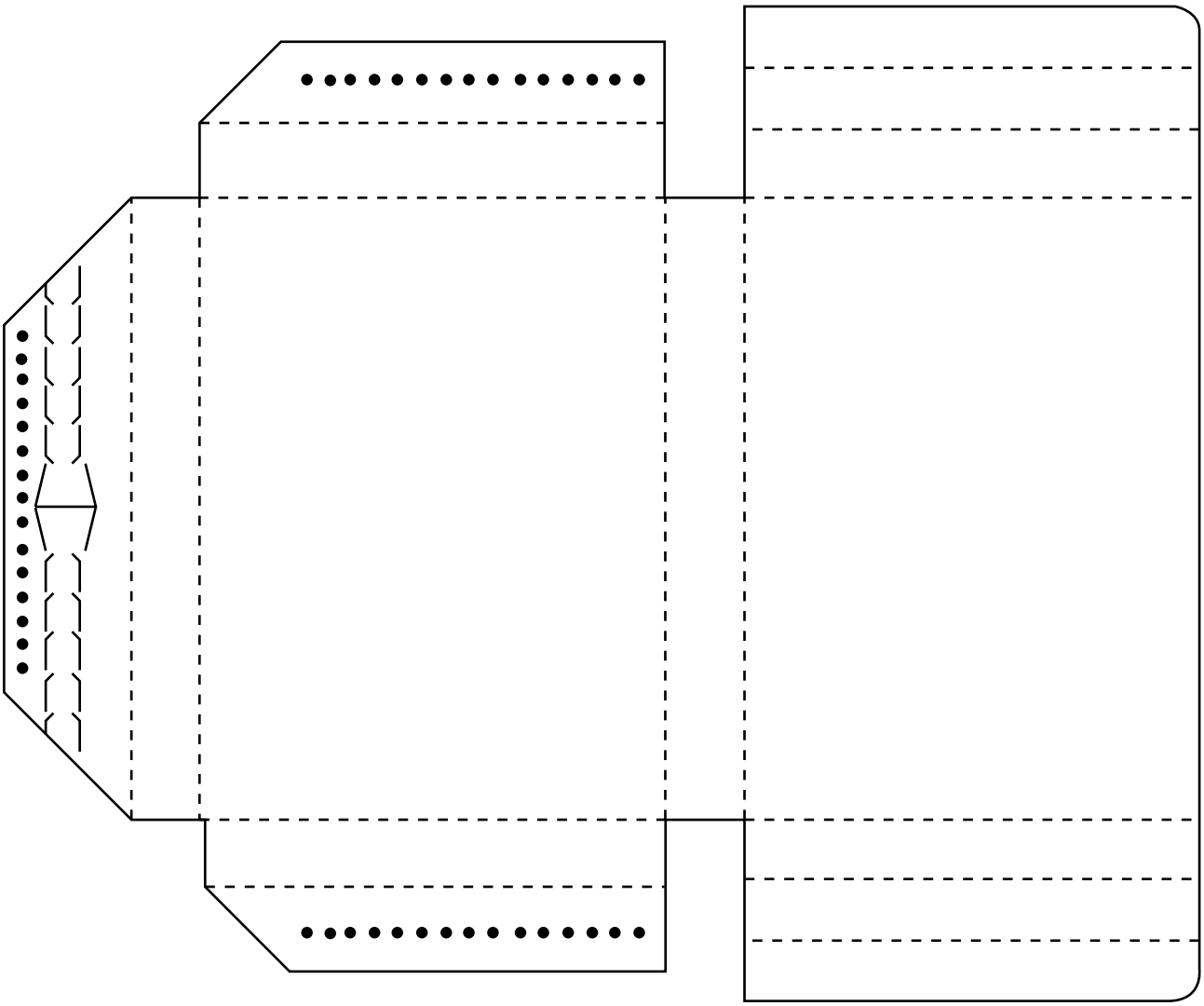


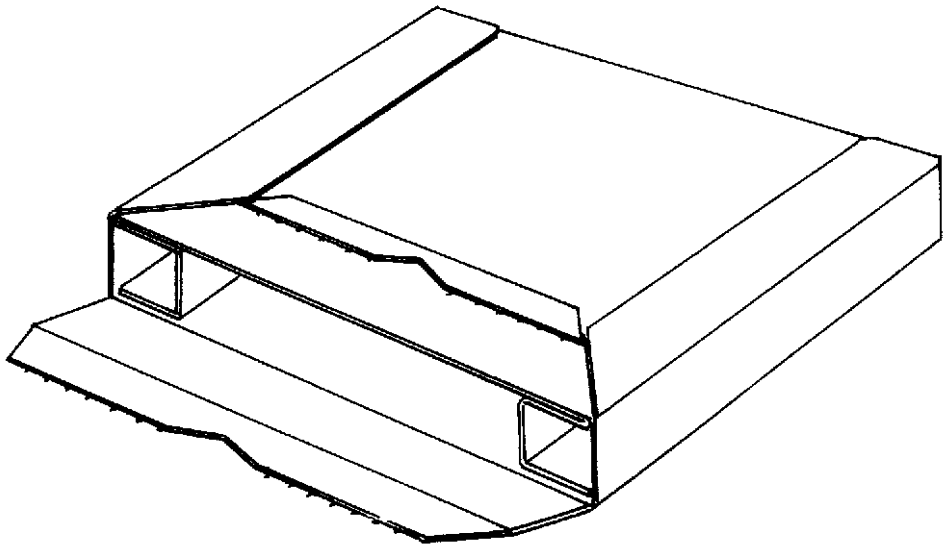


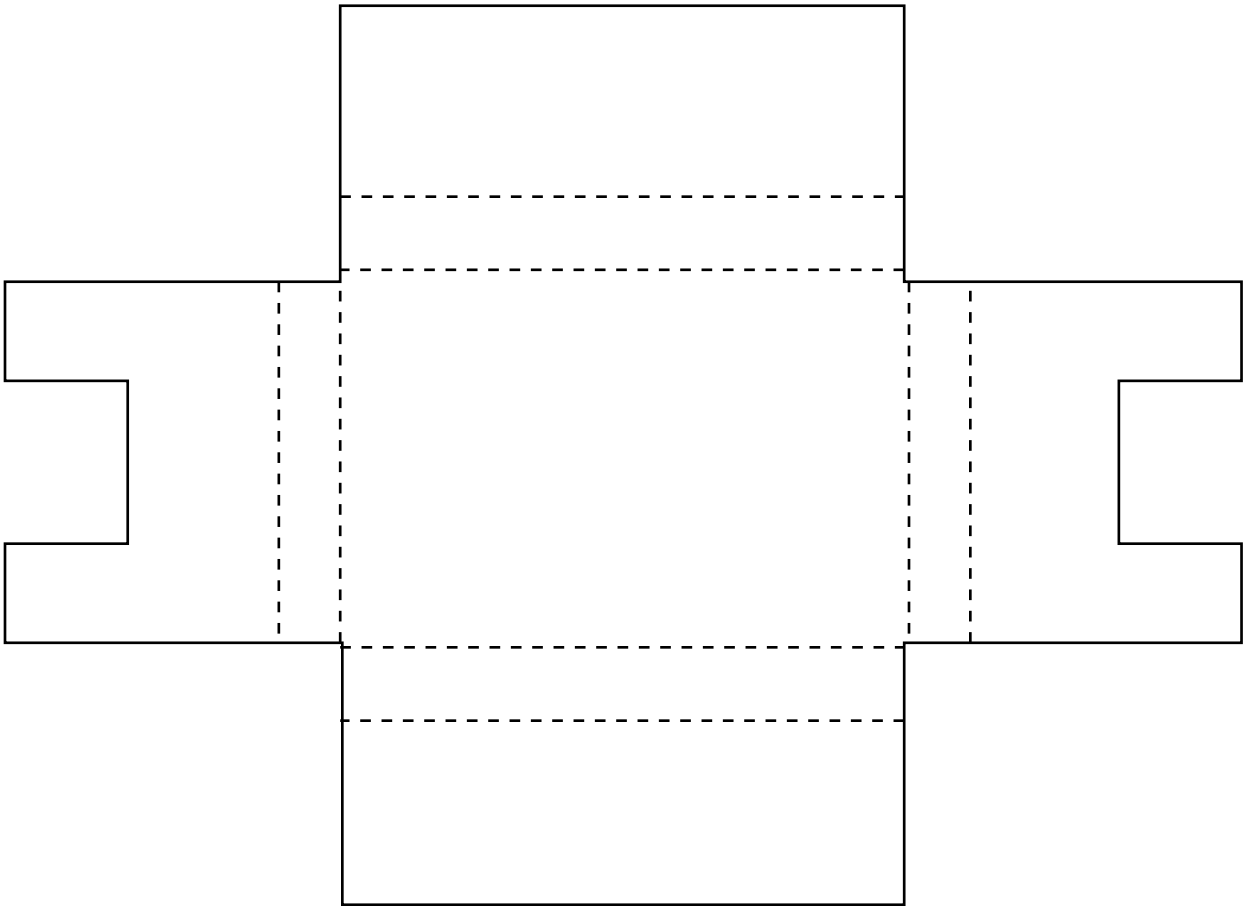


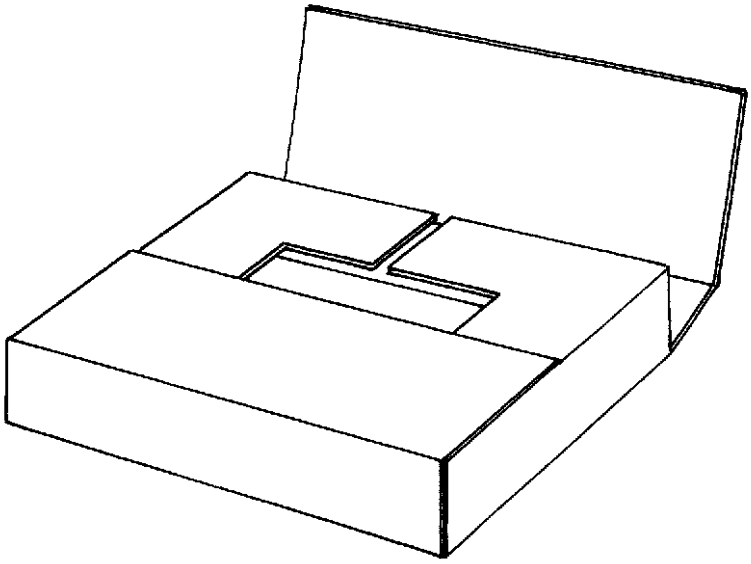


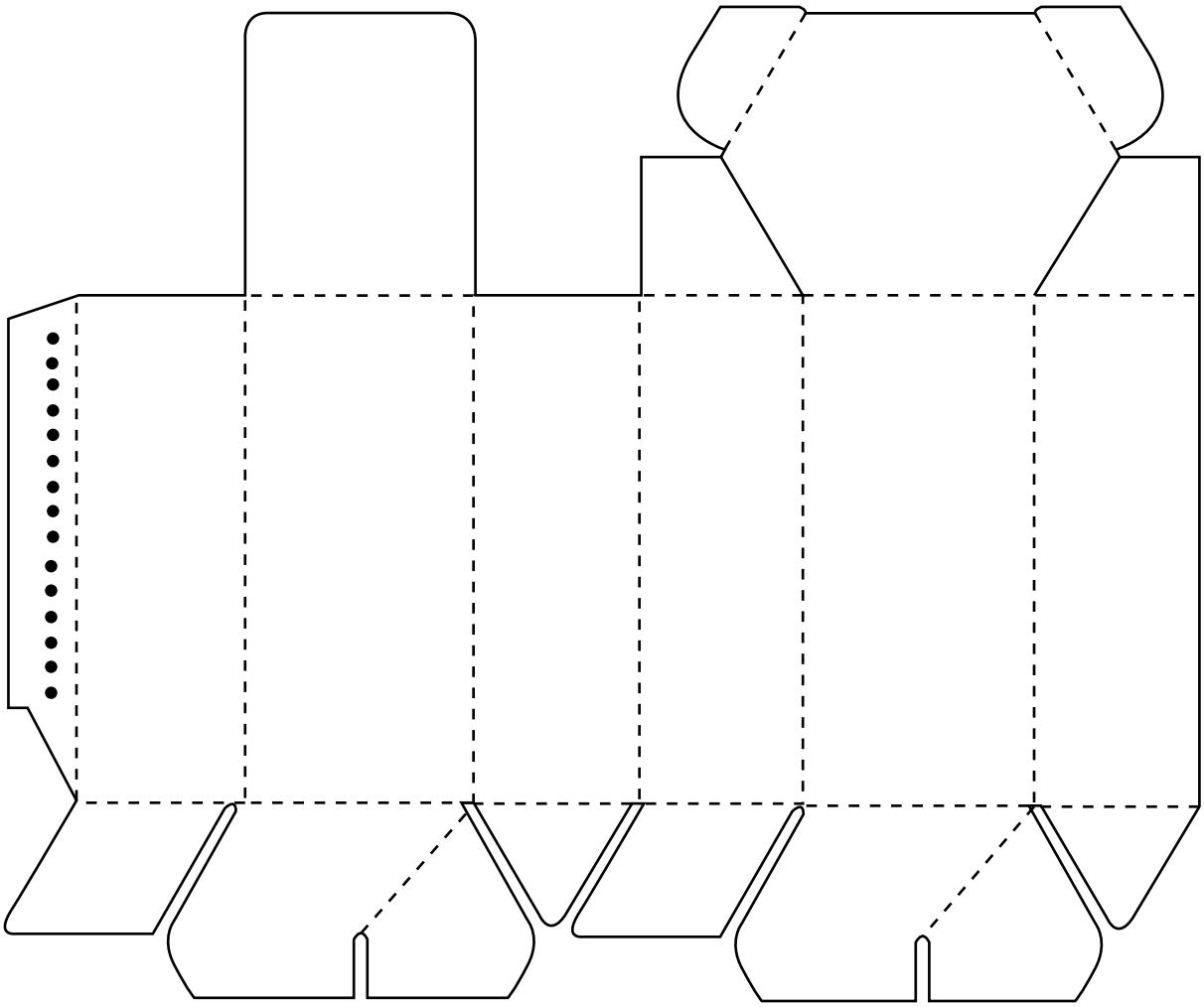


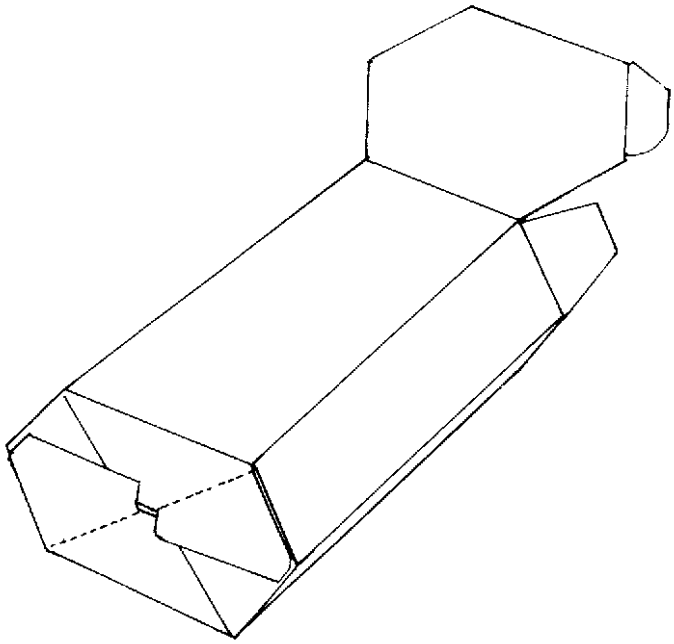


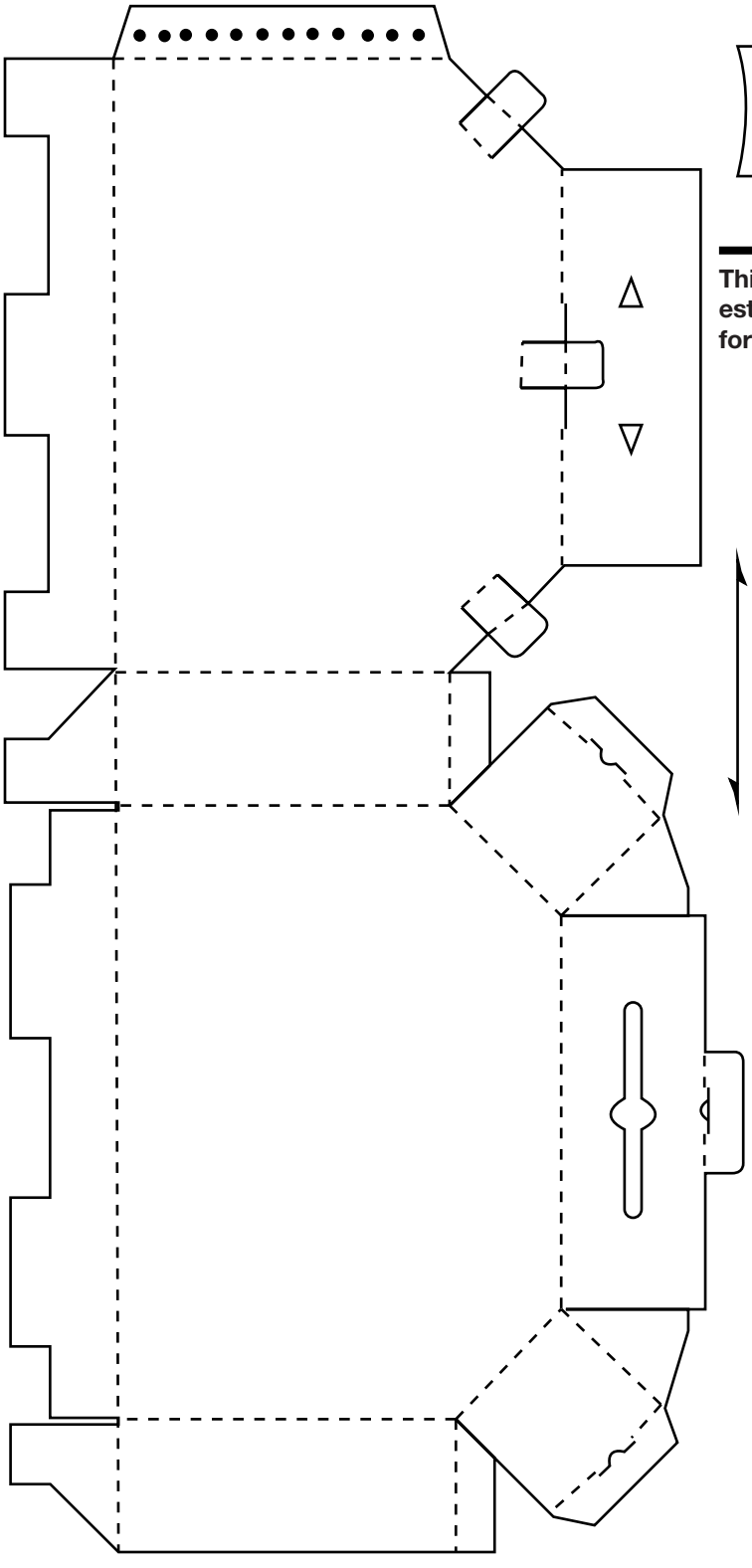


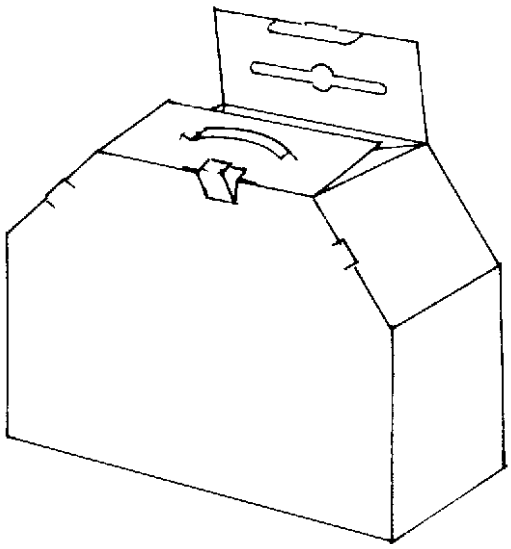




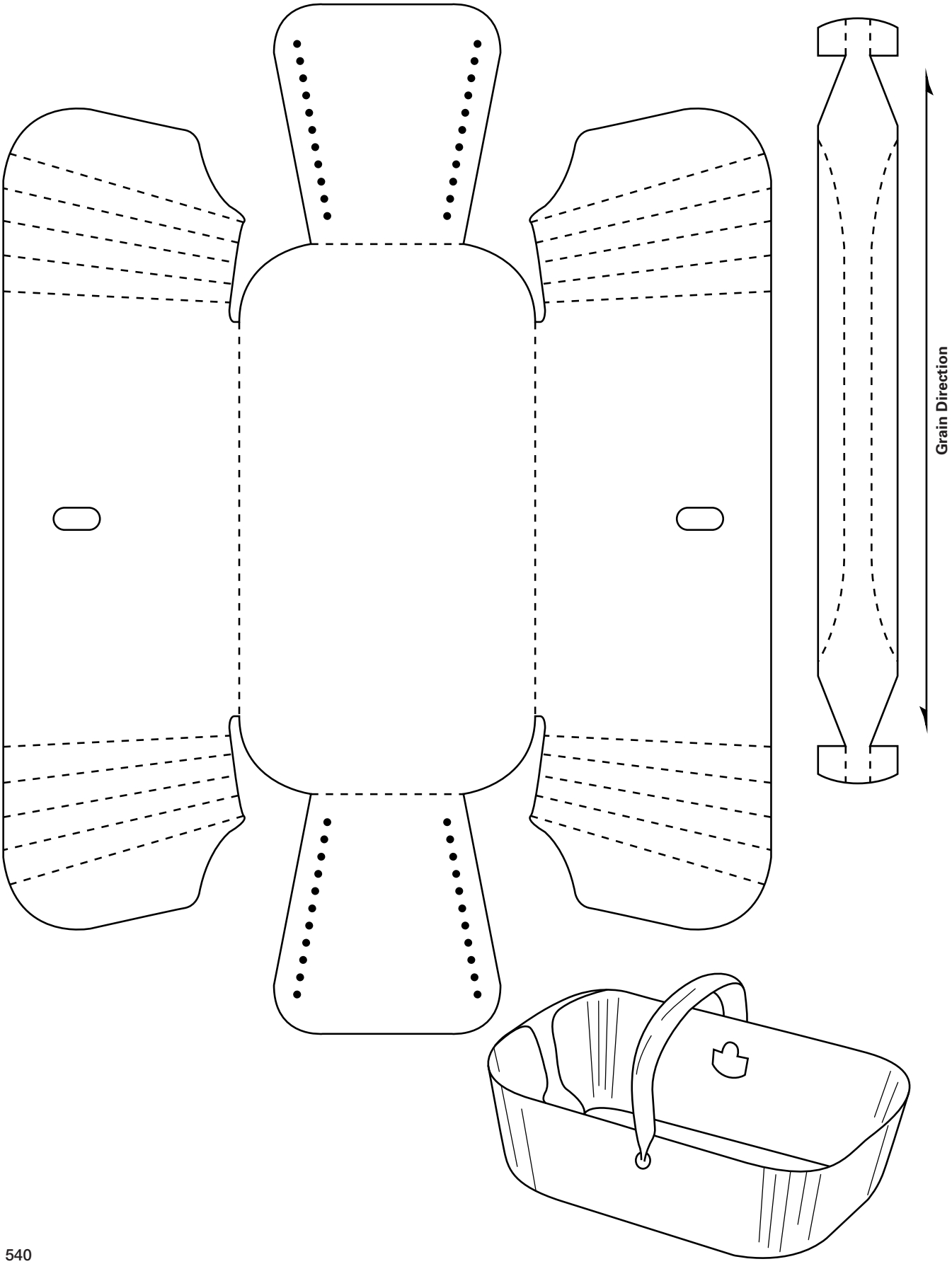


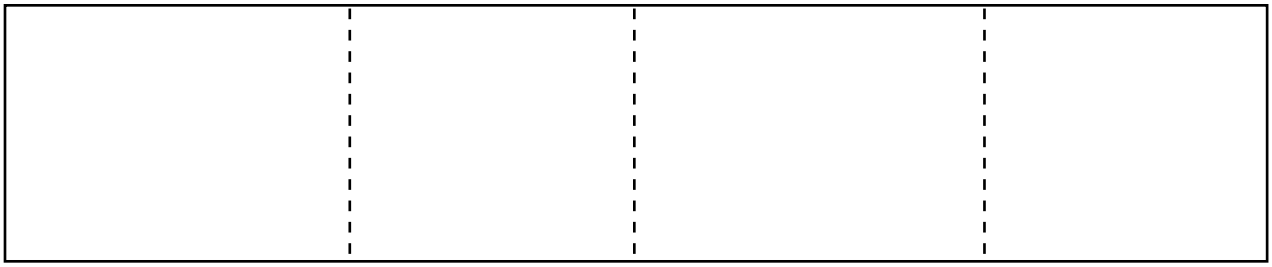


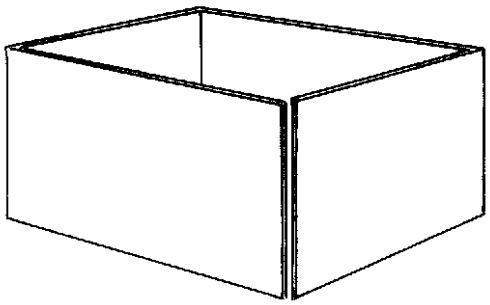


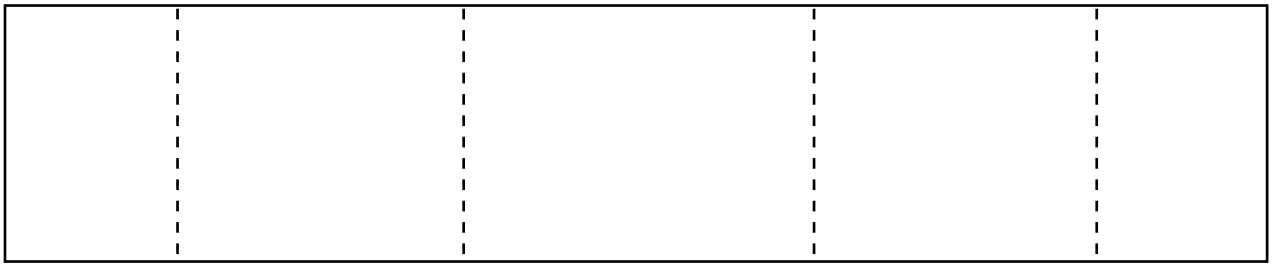


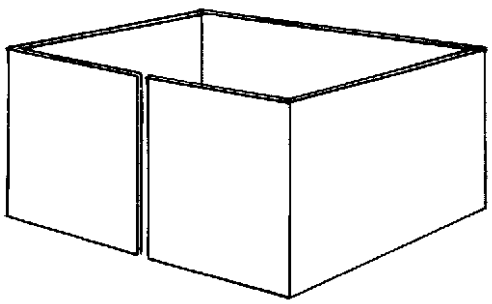
This carrying case requires no glue, features interesting configurations for the graphics, and is suitable for a large number of products.

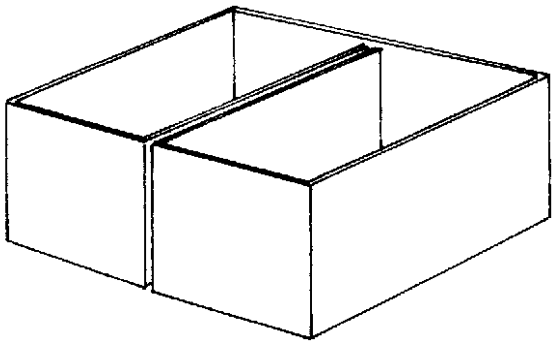

Grain Direction

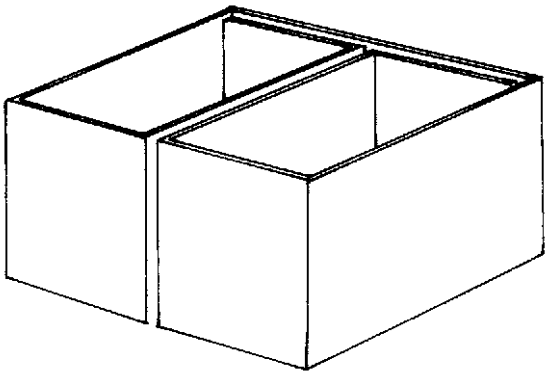


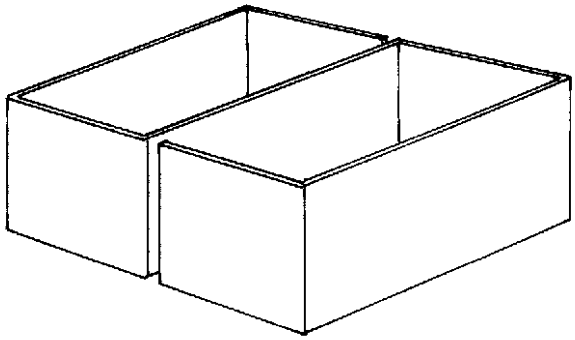


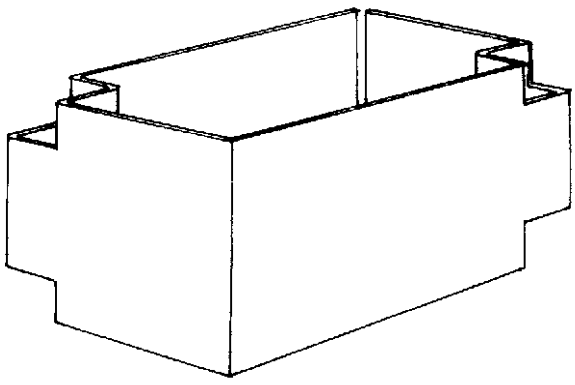


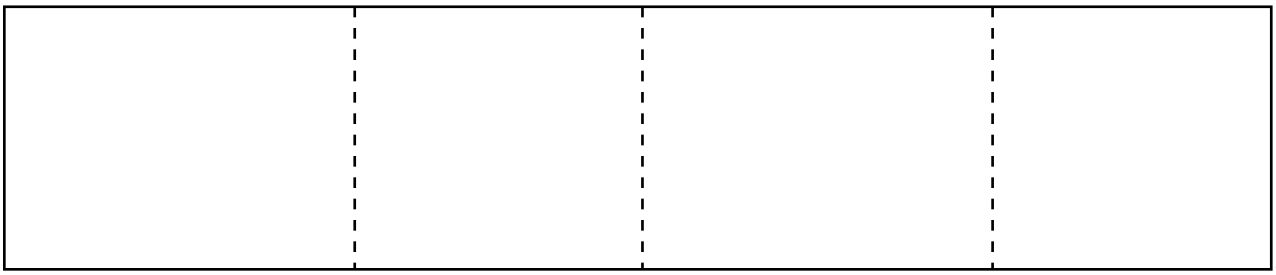


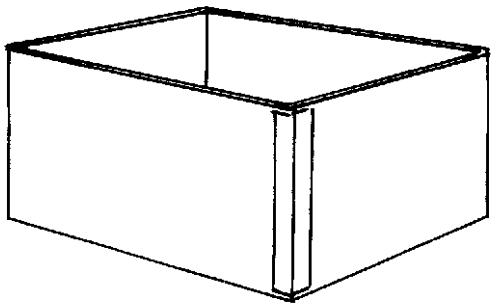


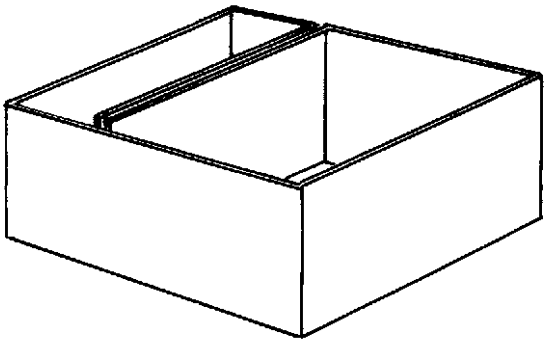


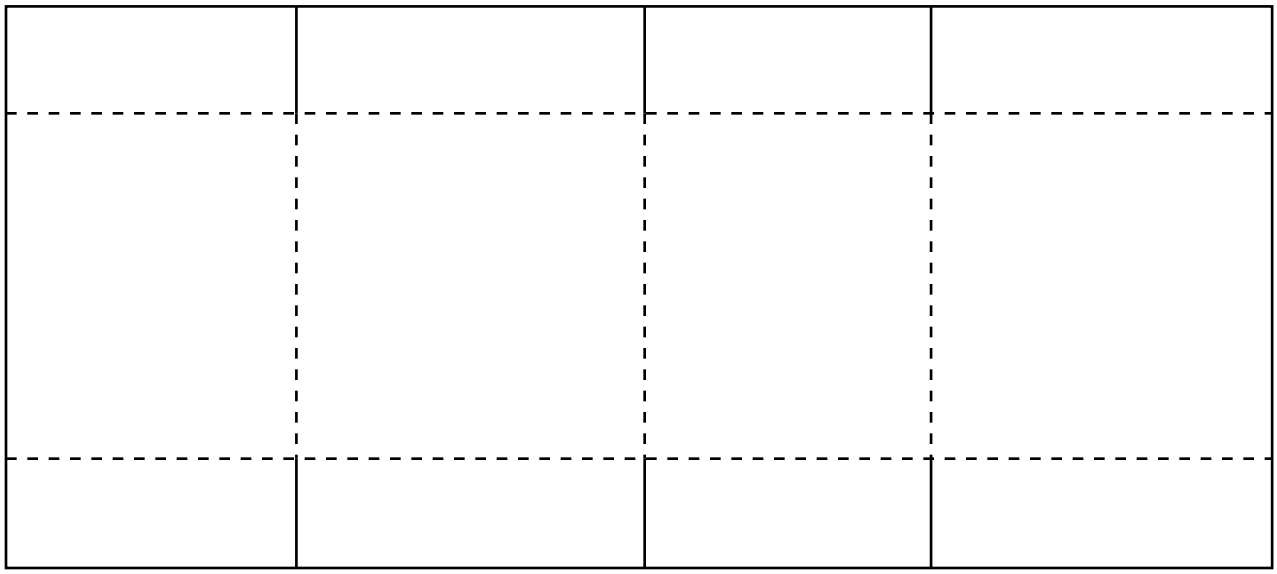


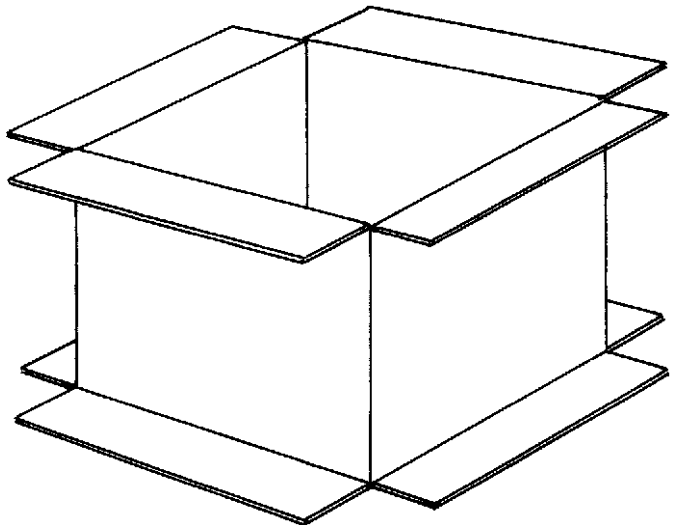


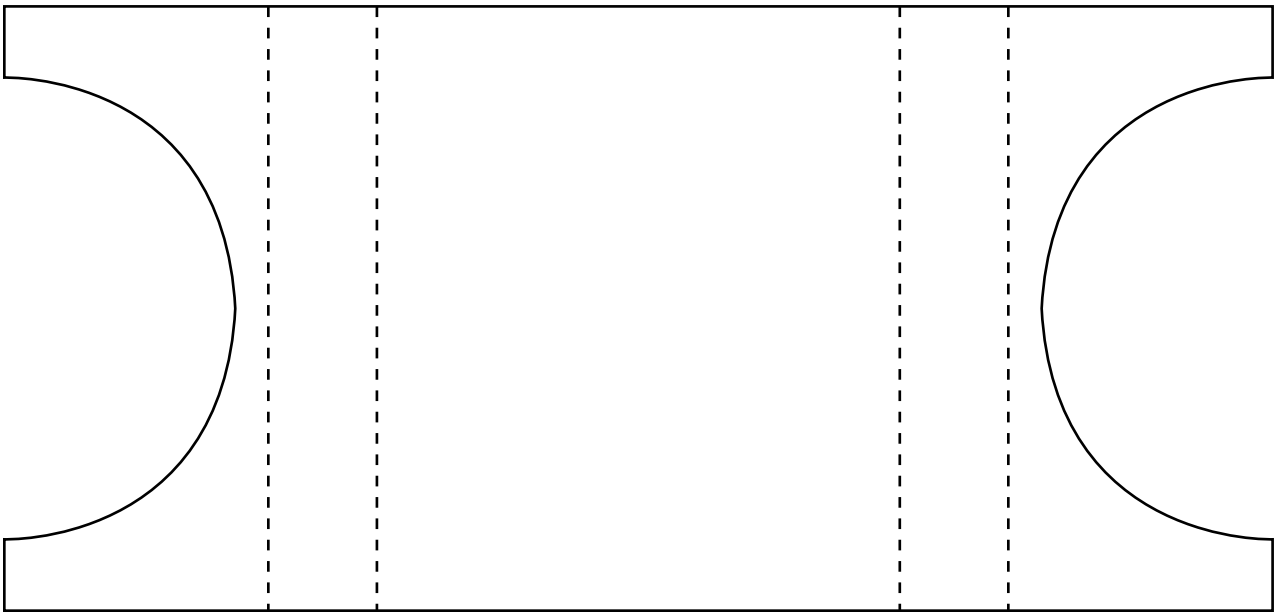


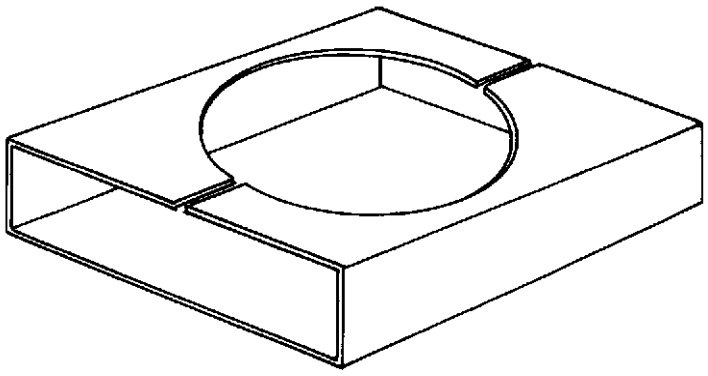


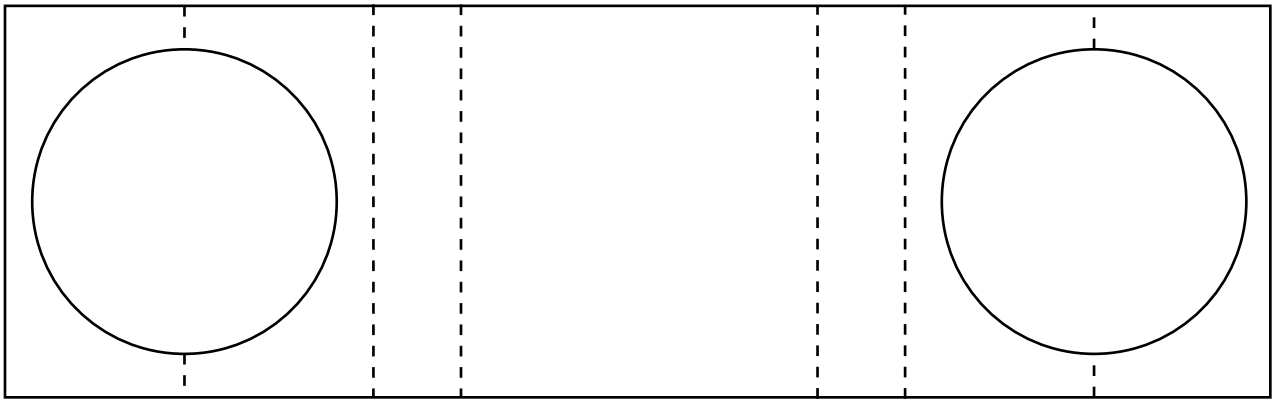


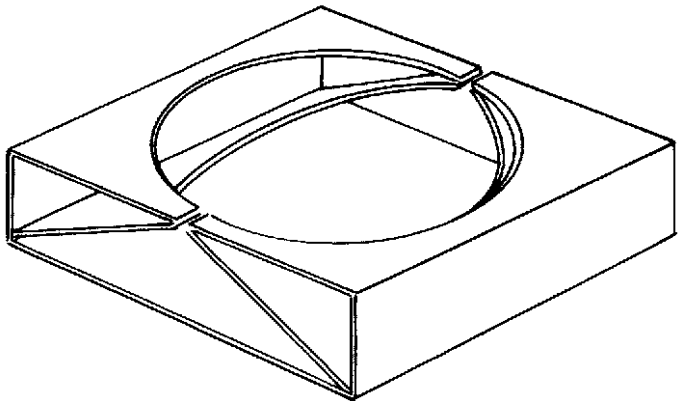


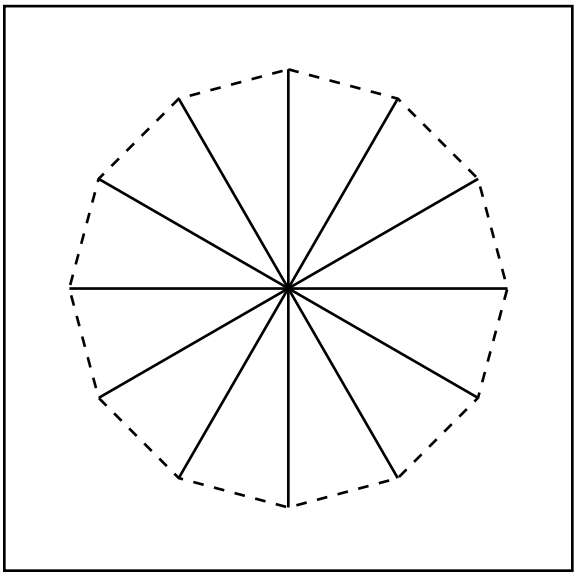


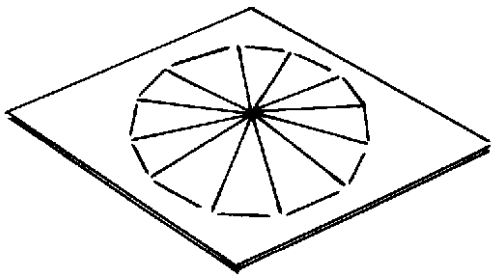


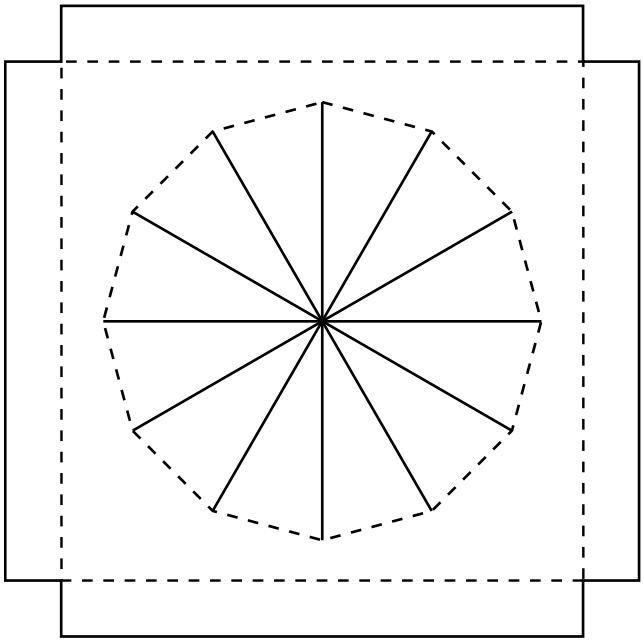


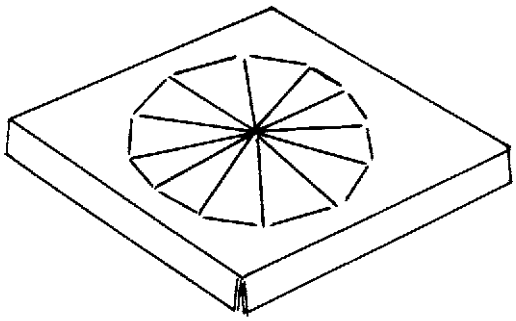


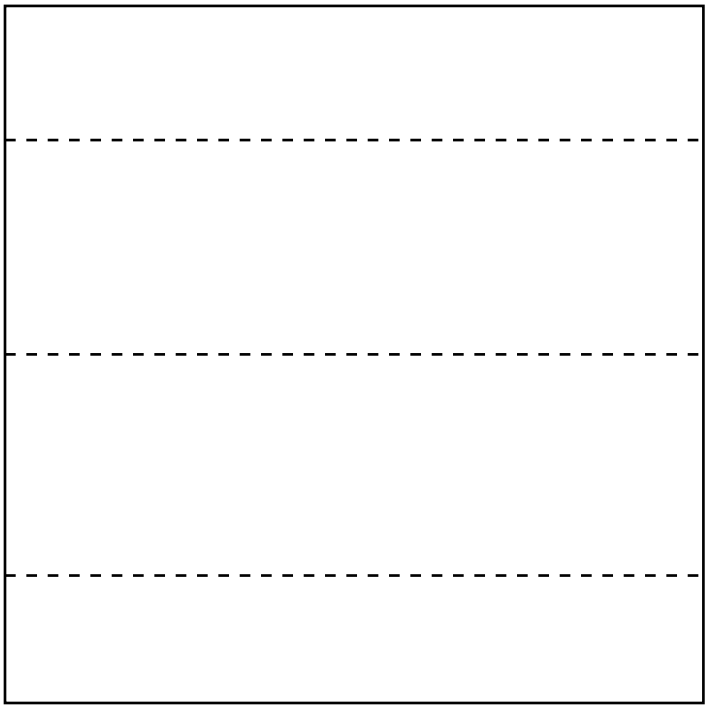


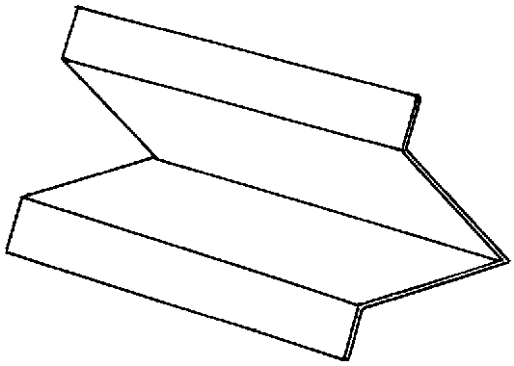


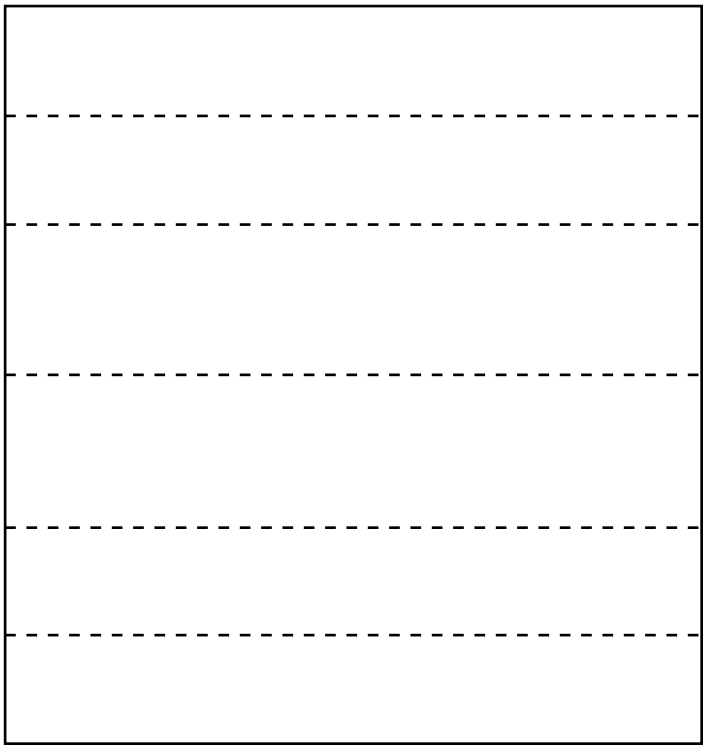


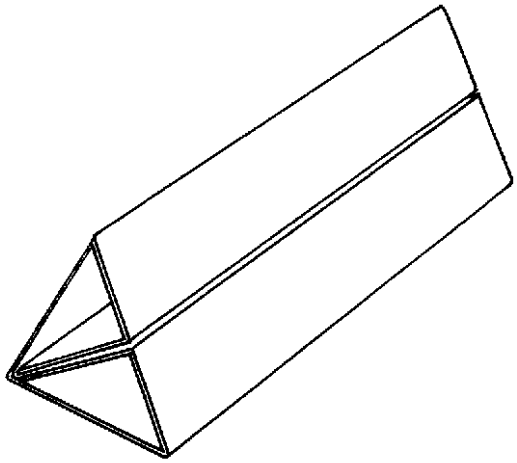


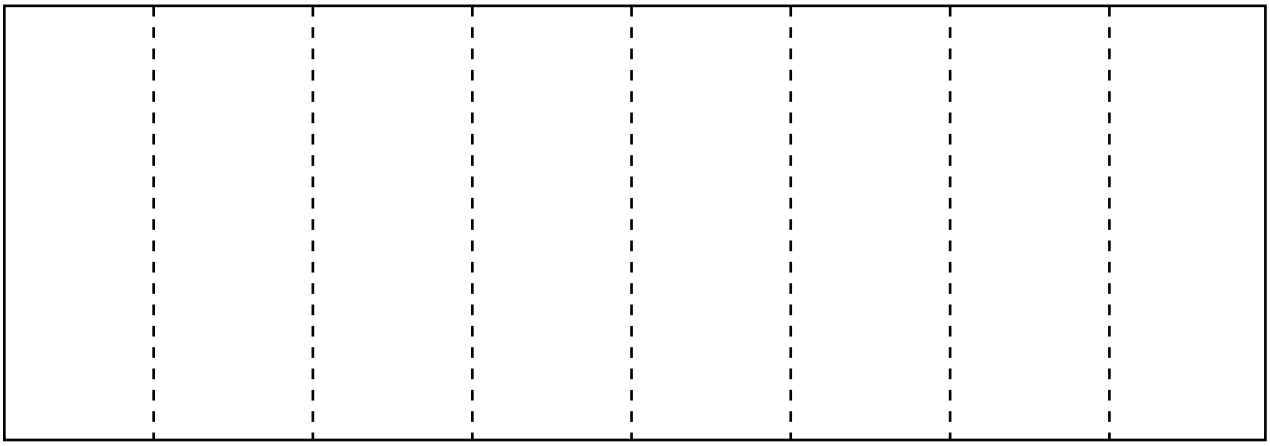


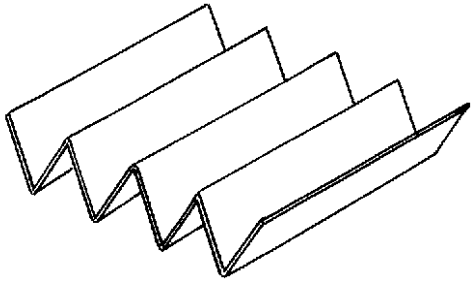


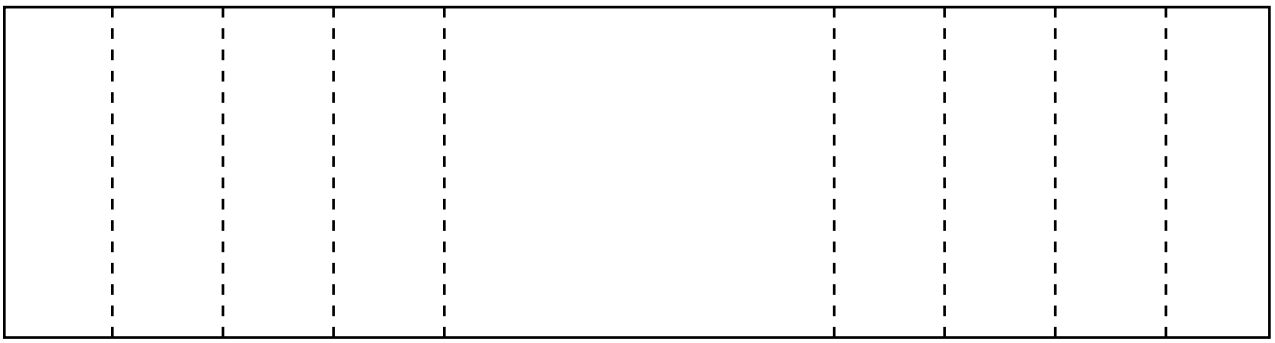


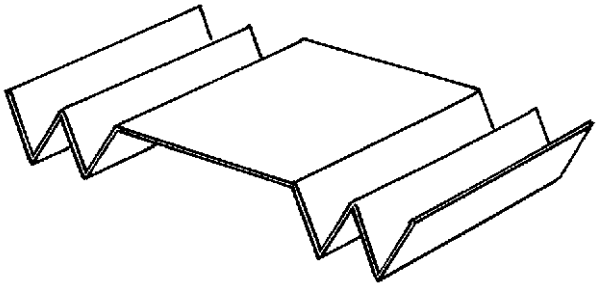


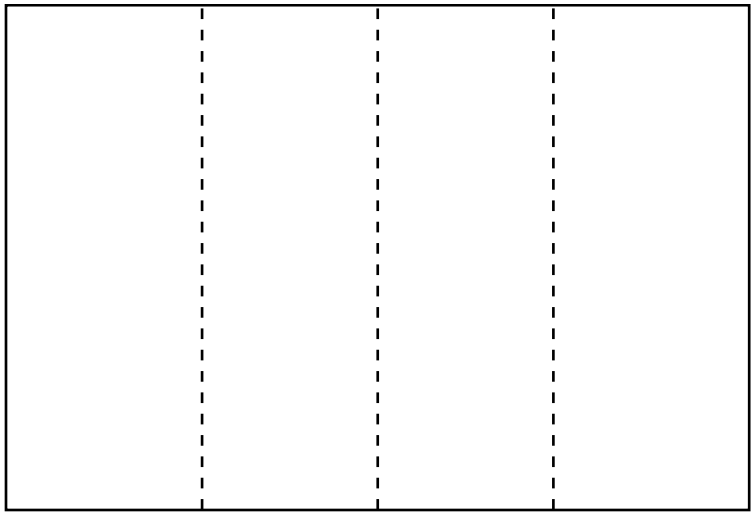


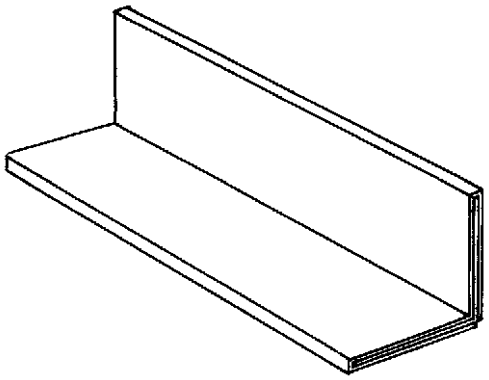


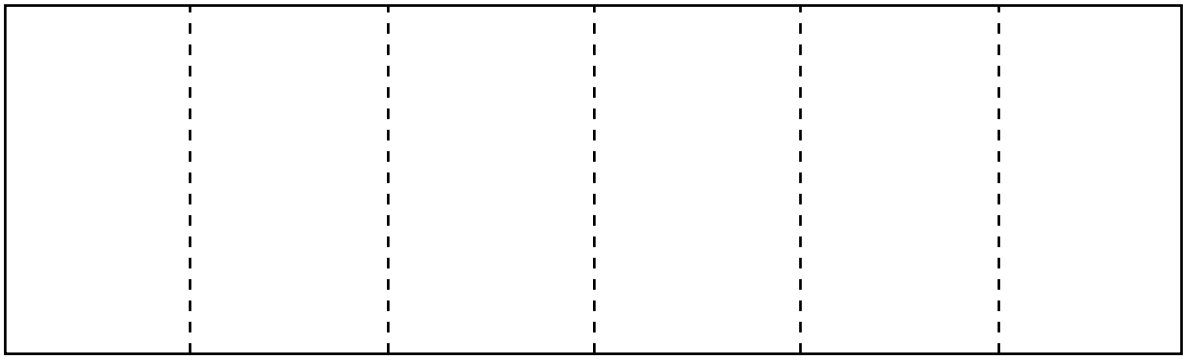


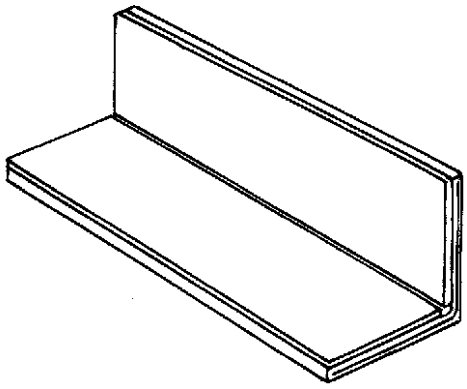


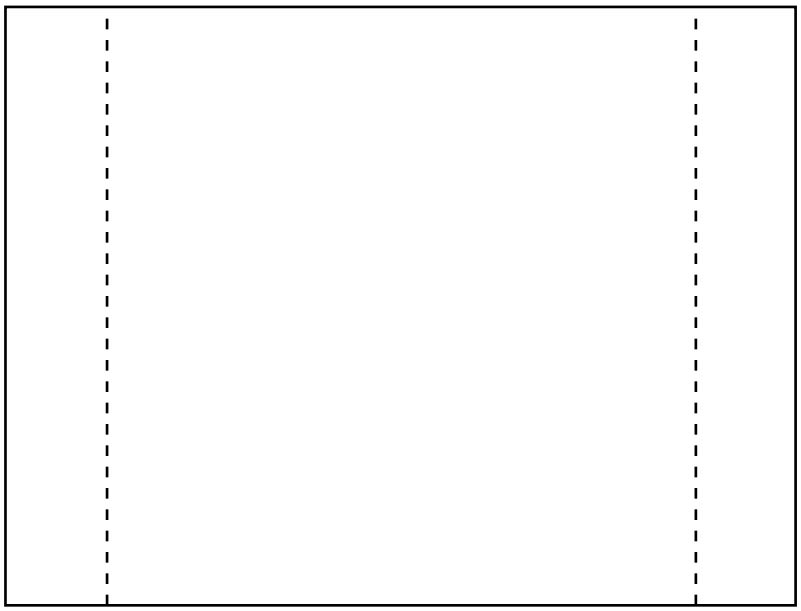


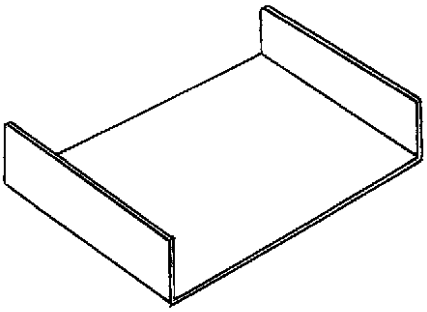


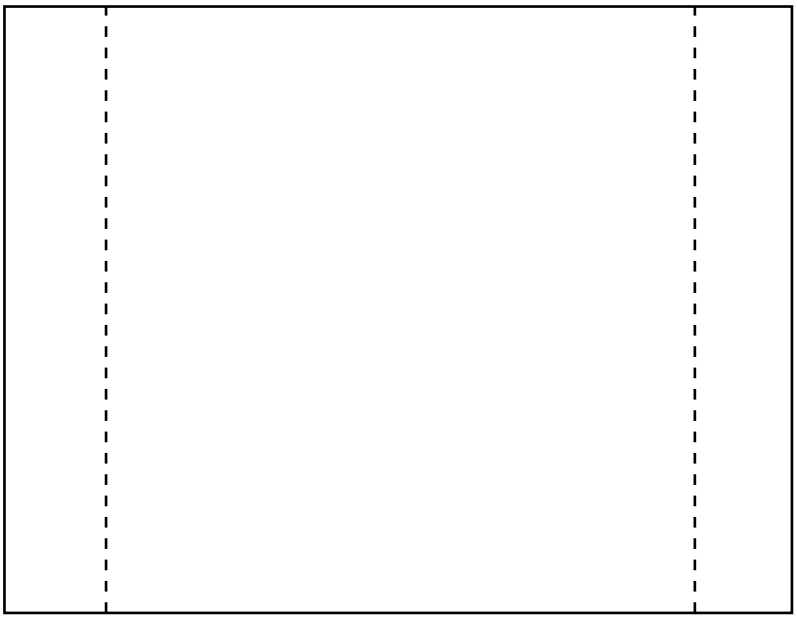


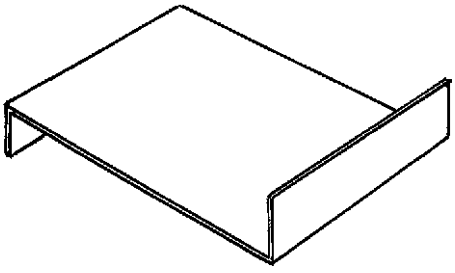


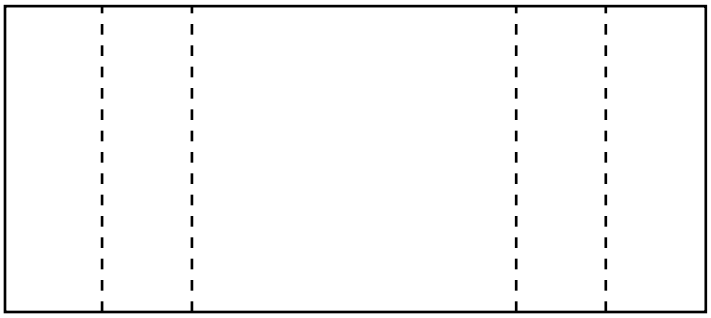


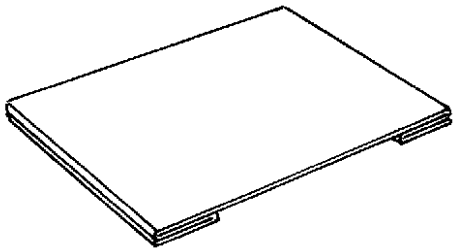


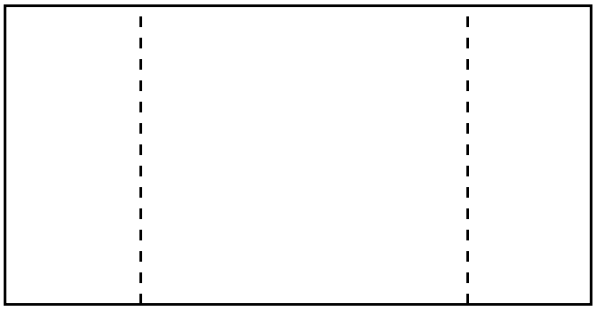


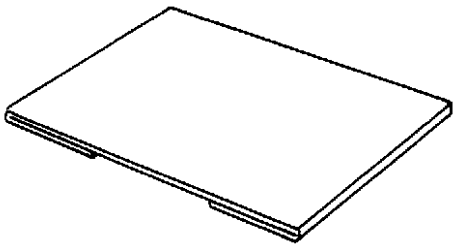


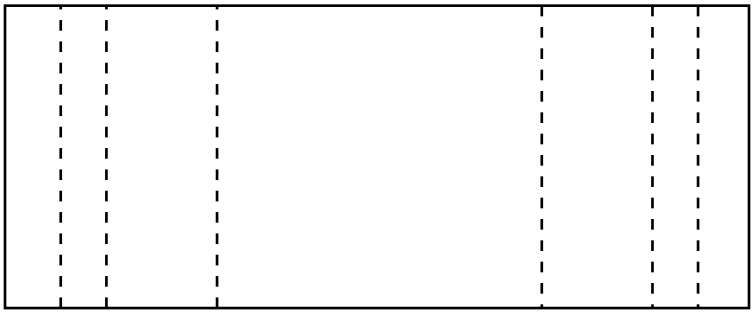


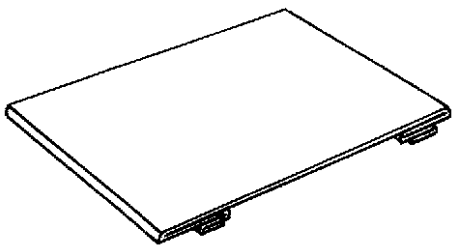


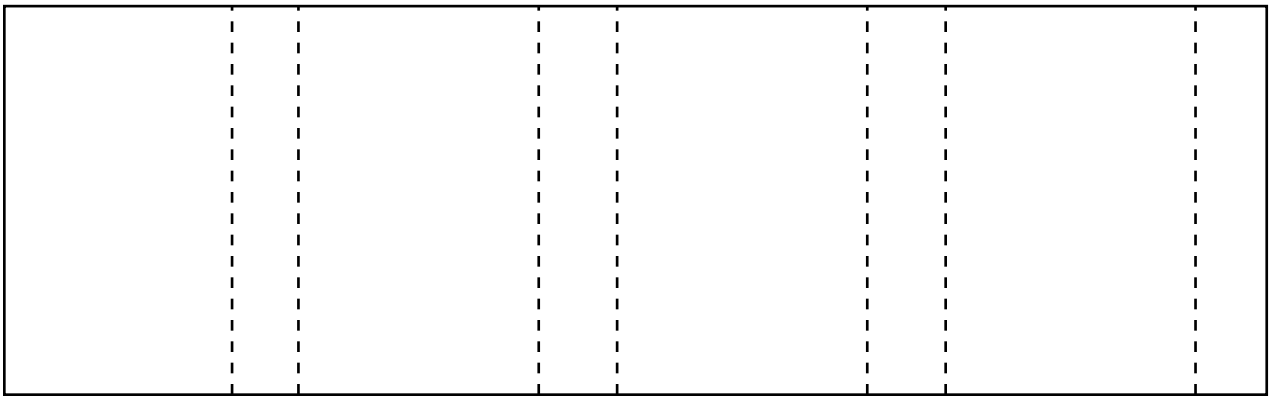


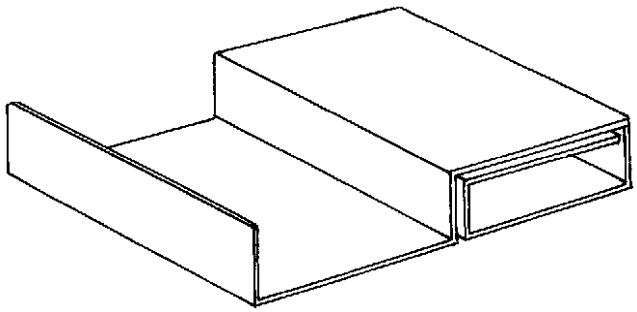


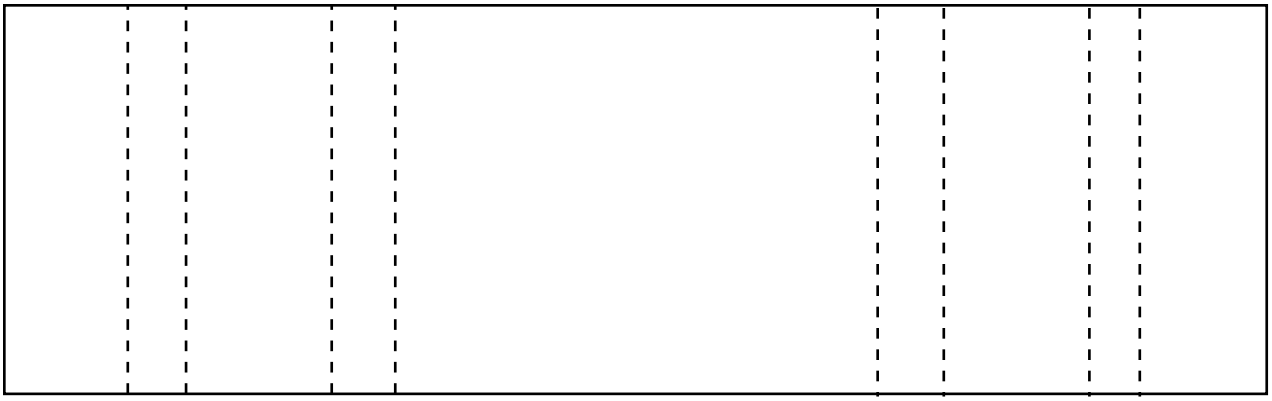


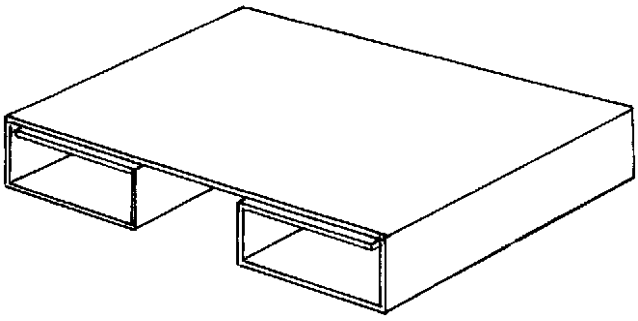


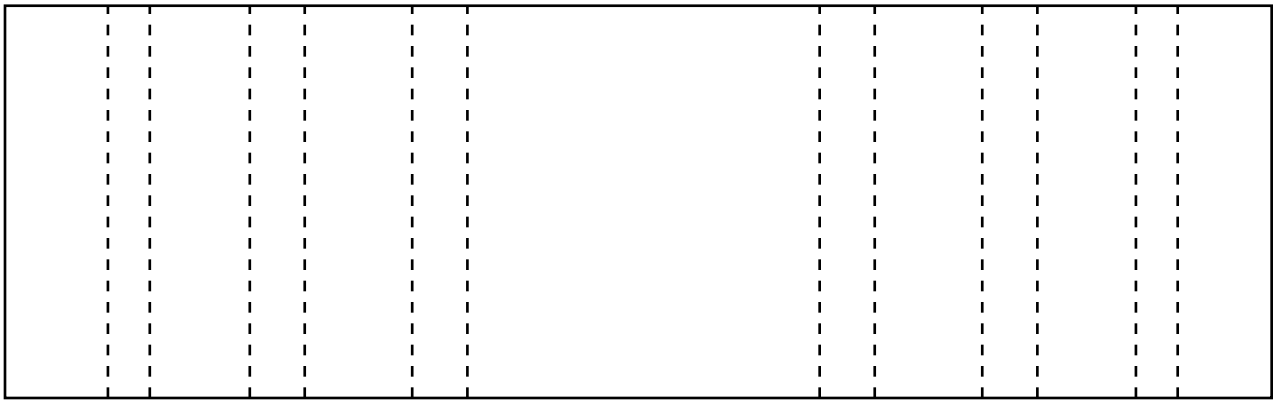


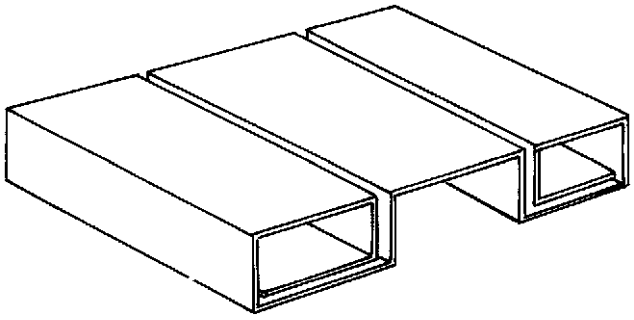


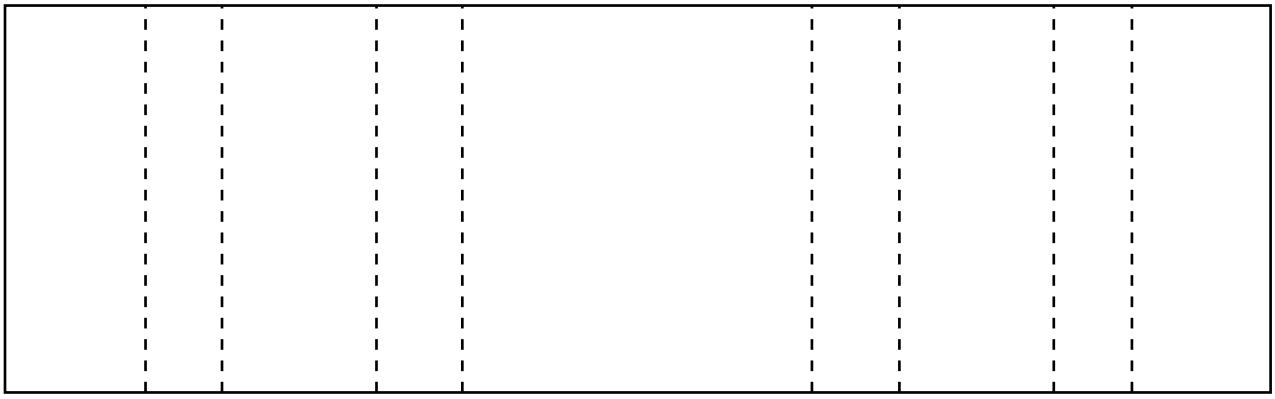


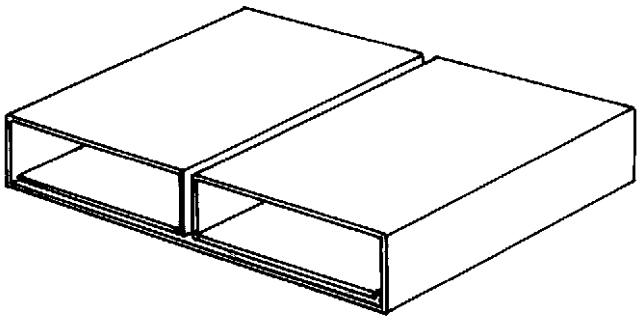


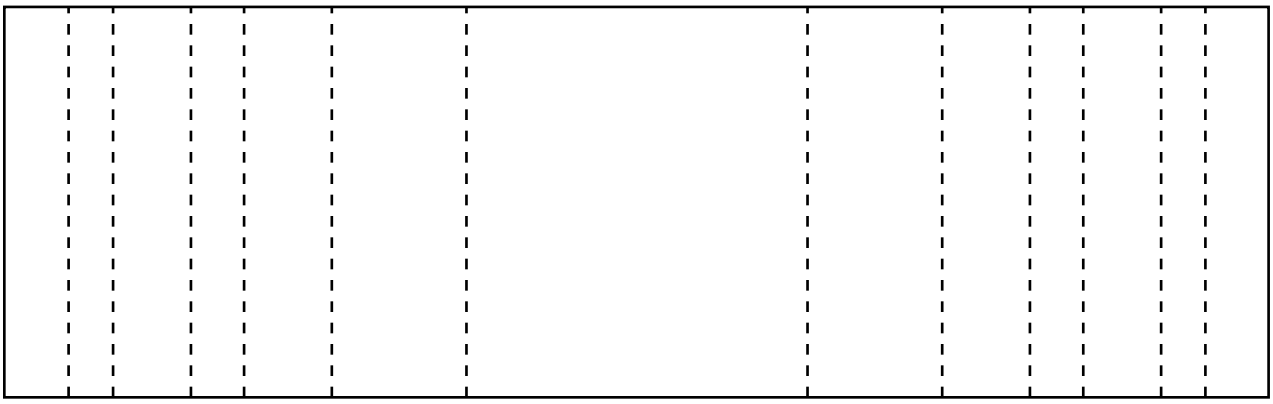


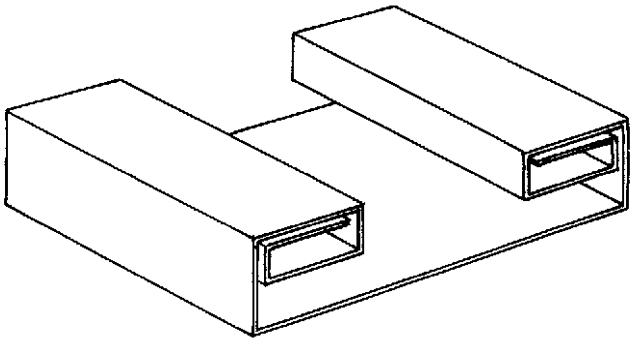


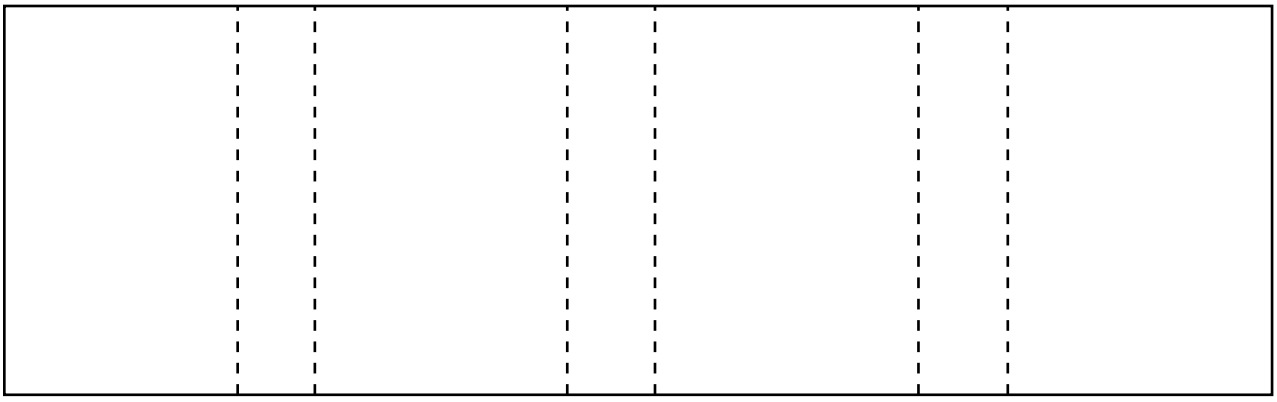


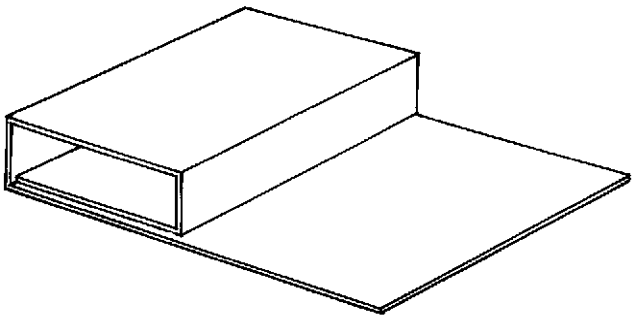


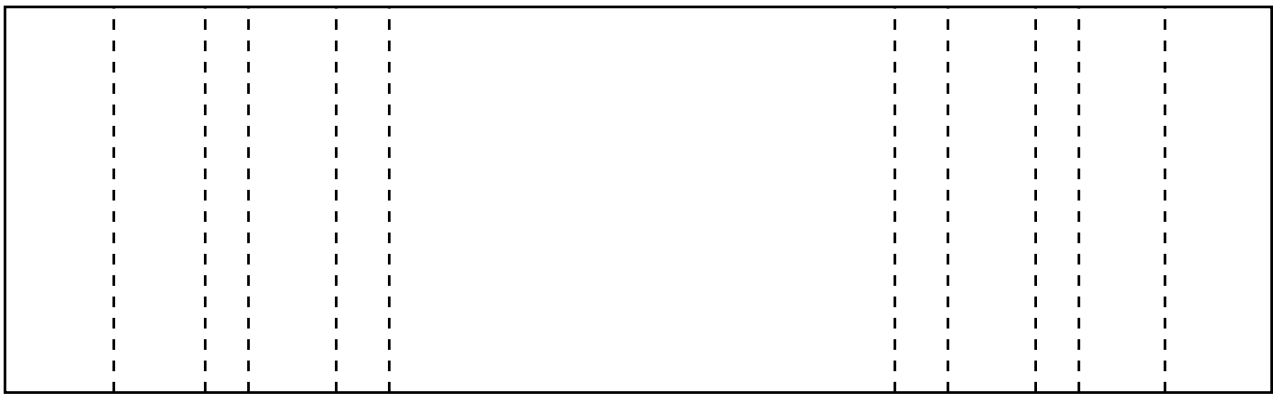


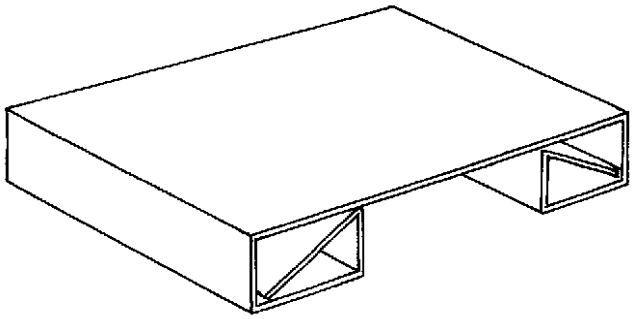


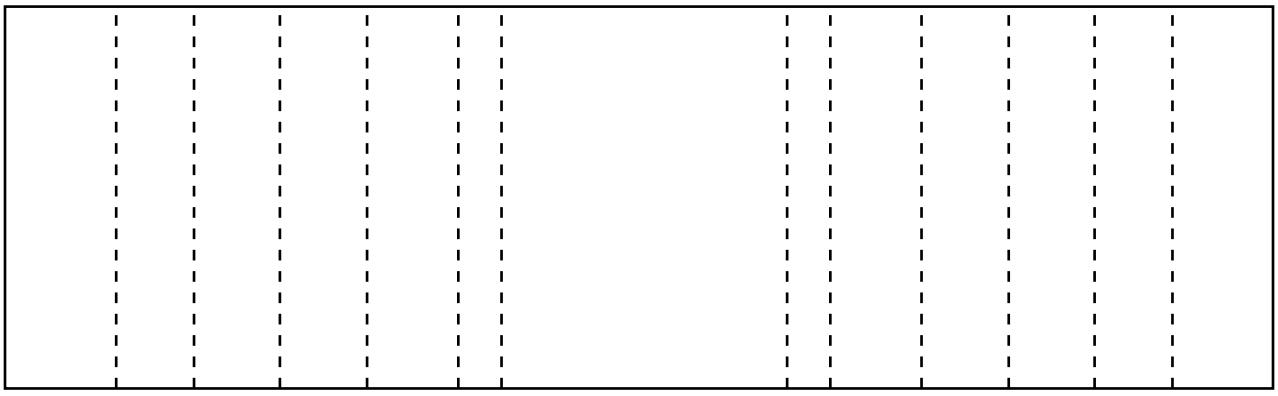


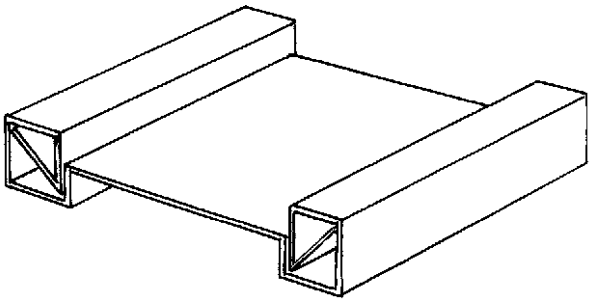












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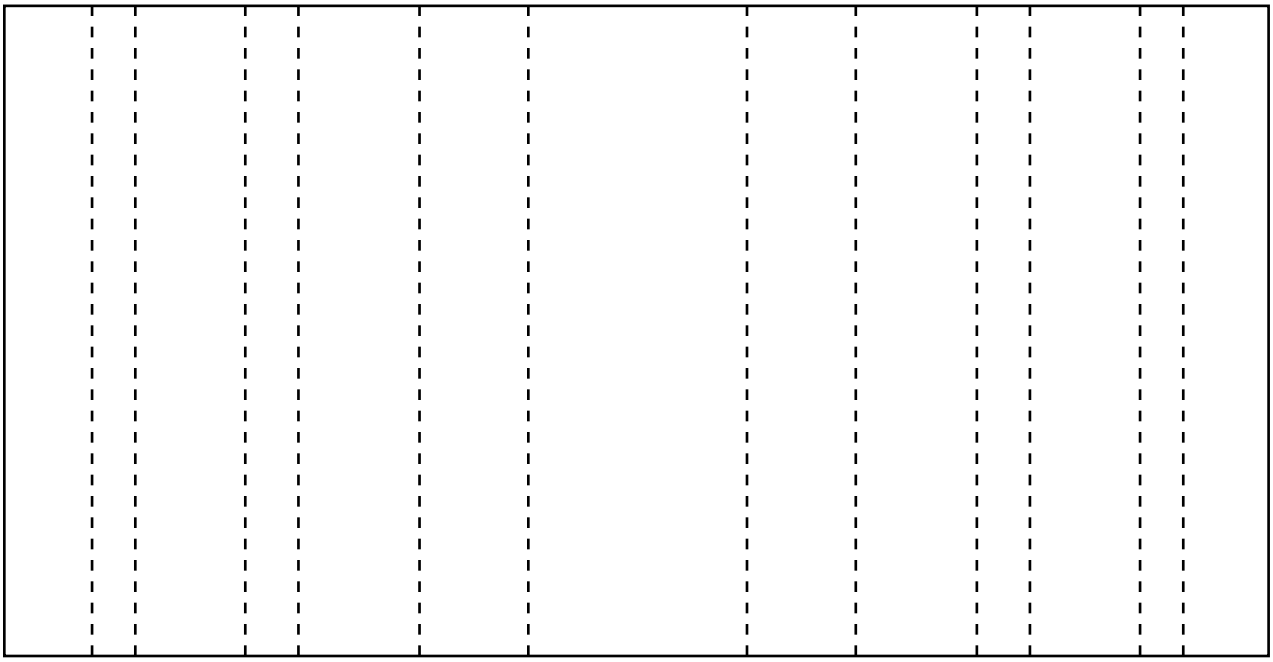
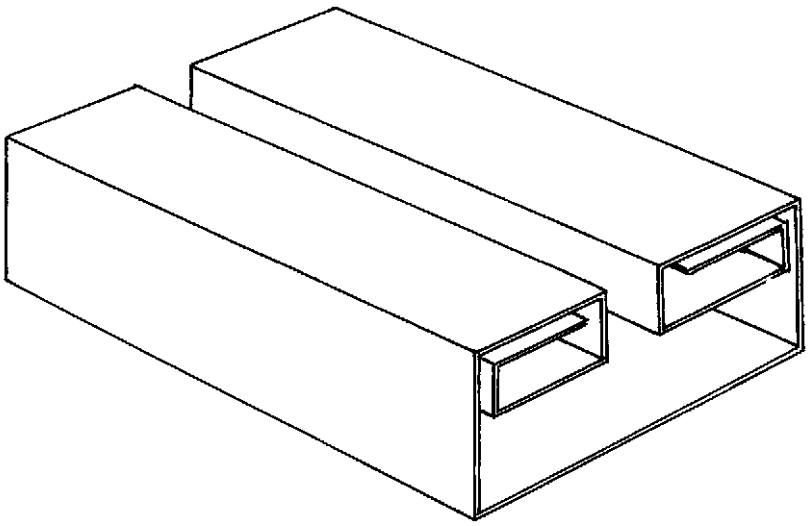
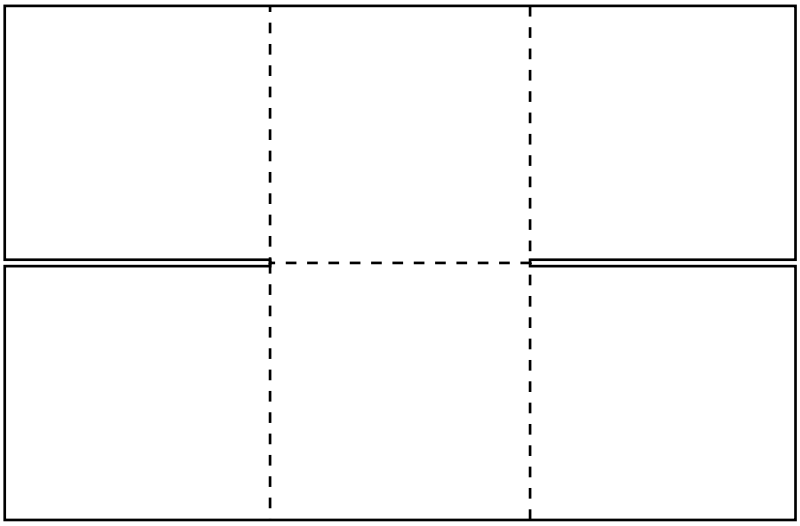
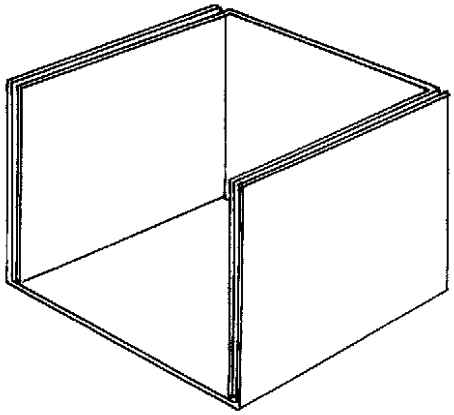
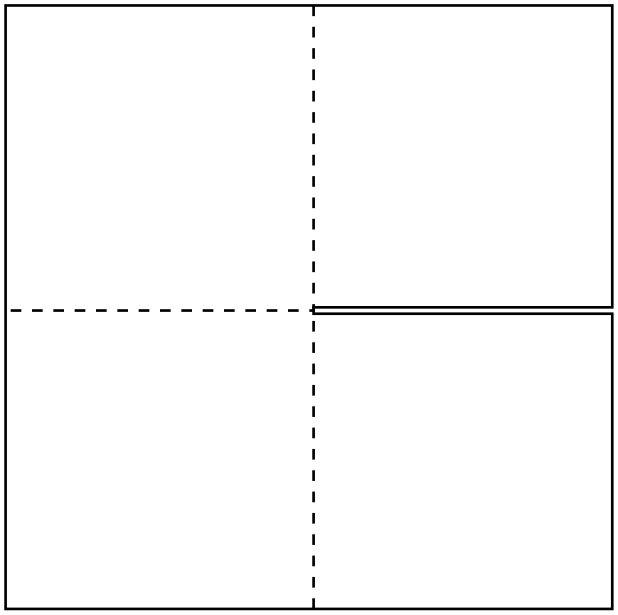
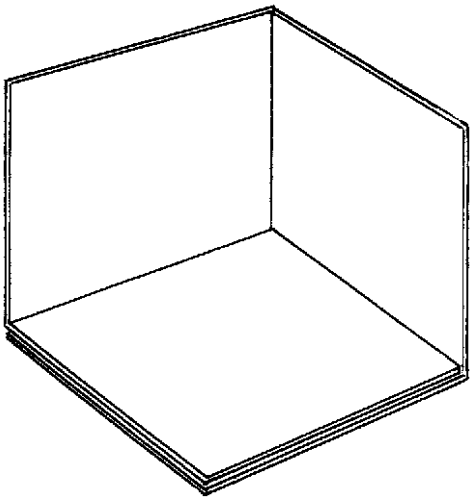


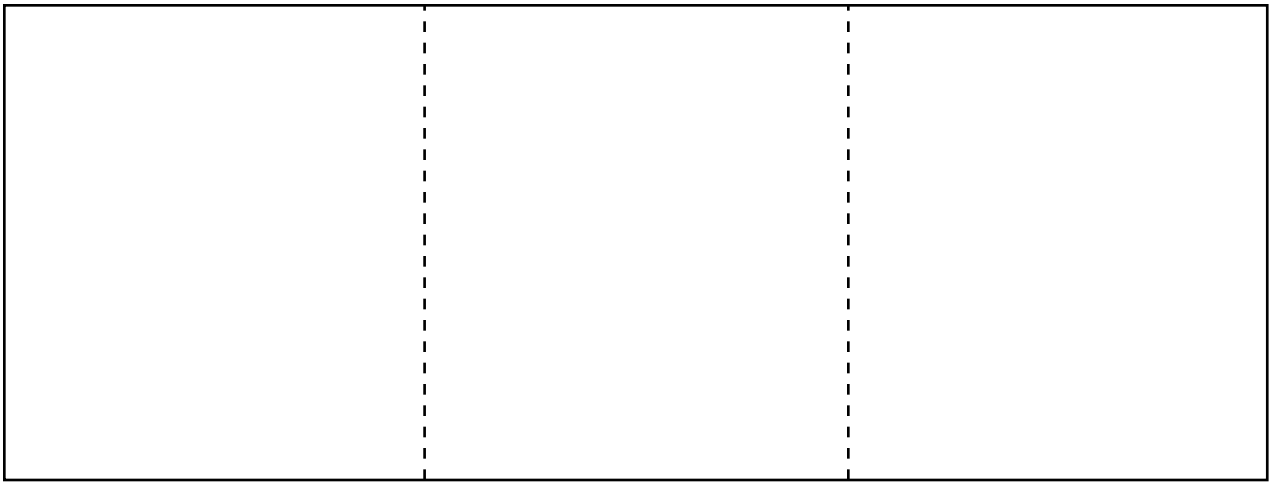


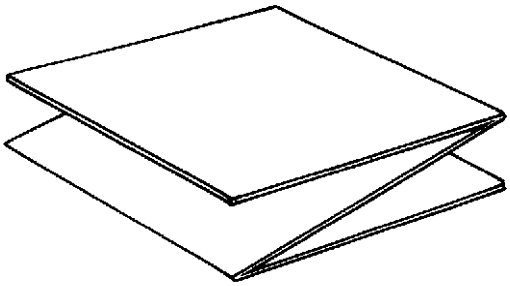


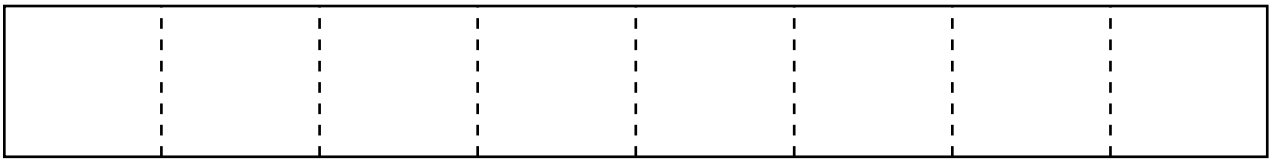


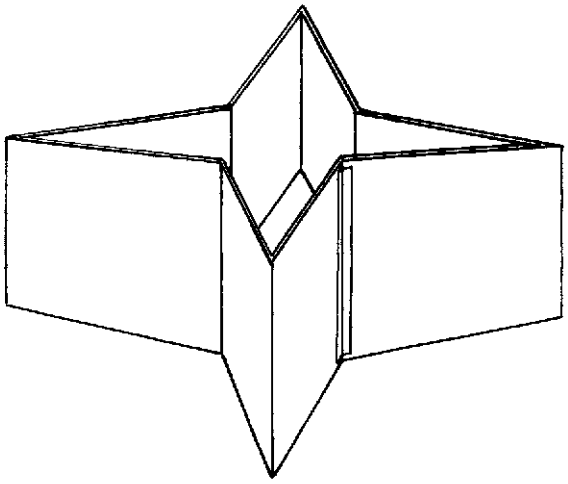


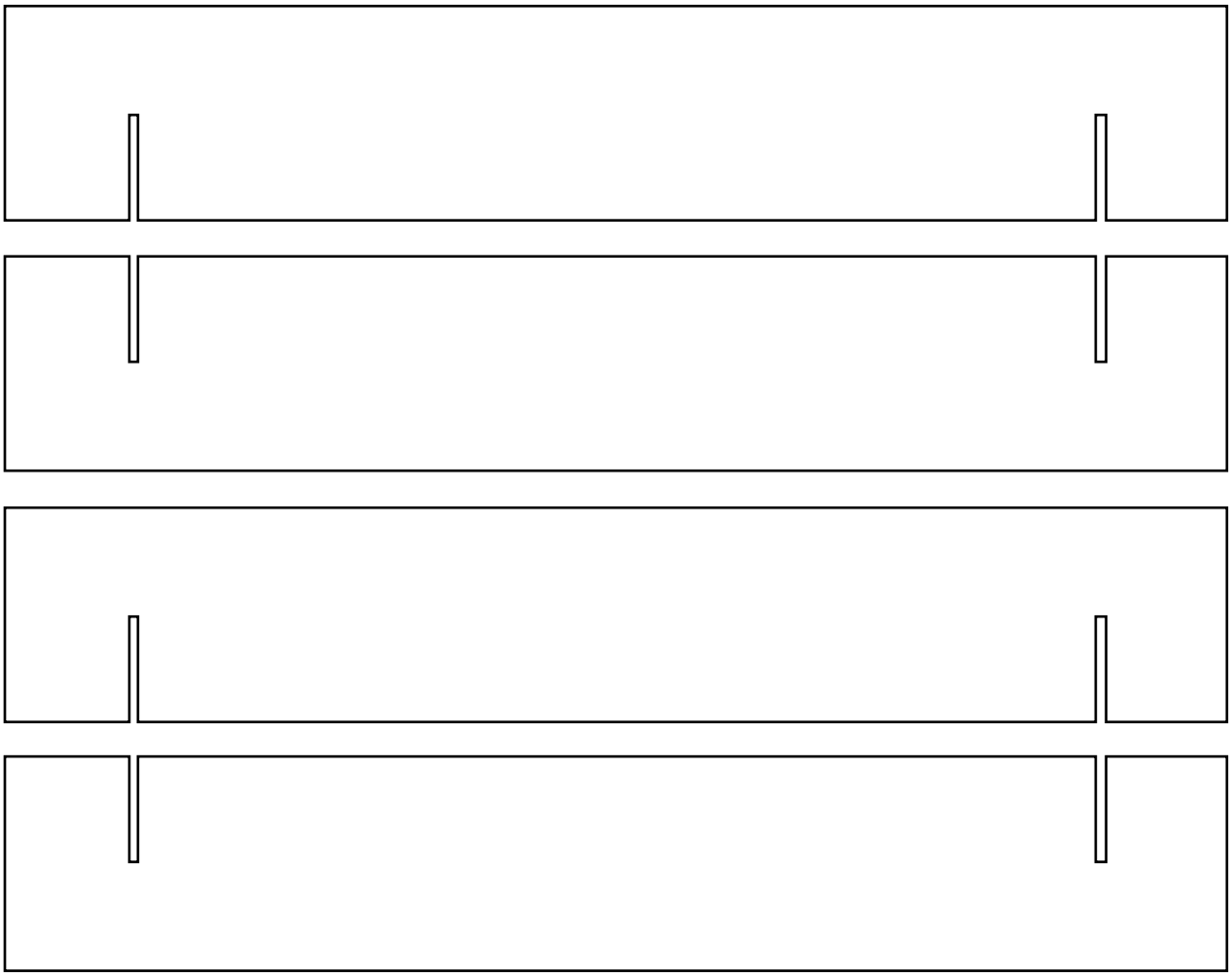


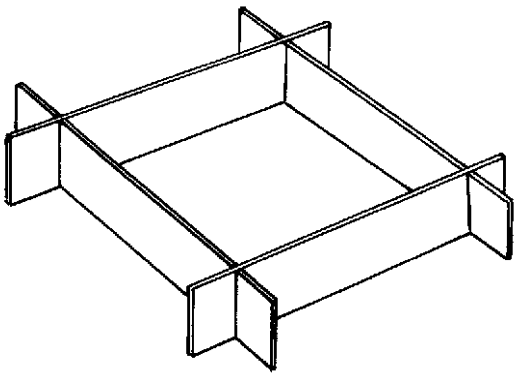


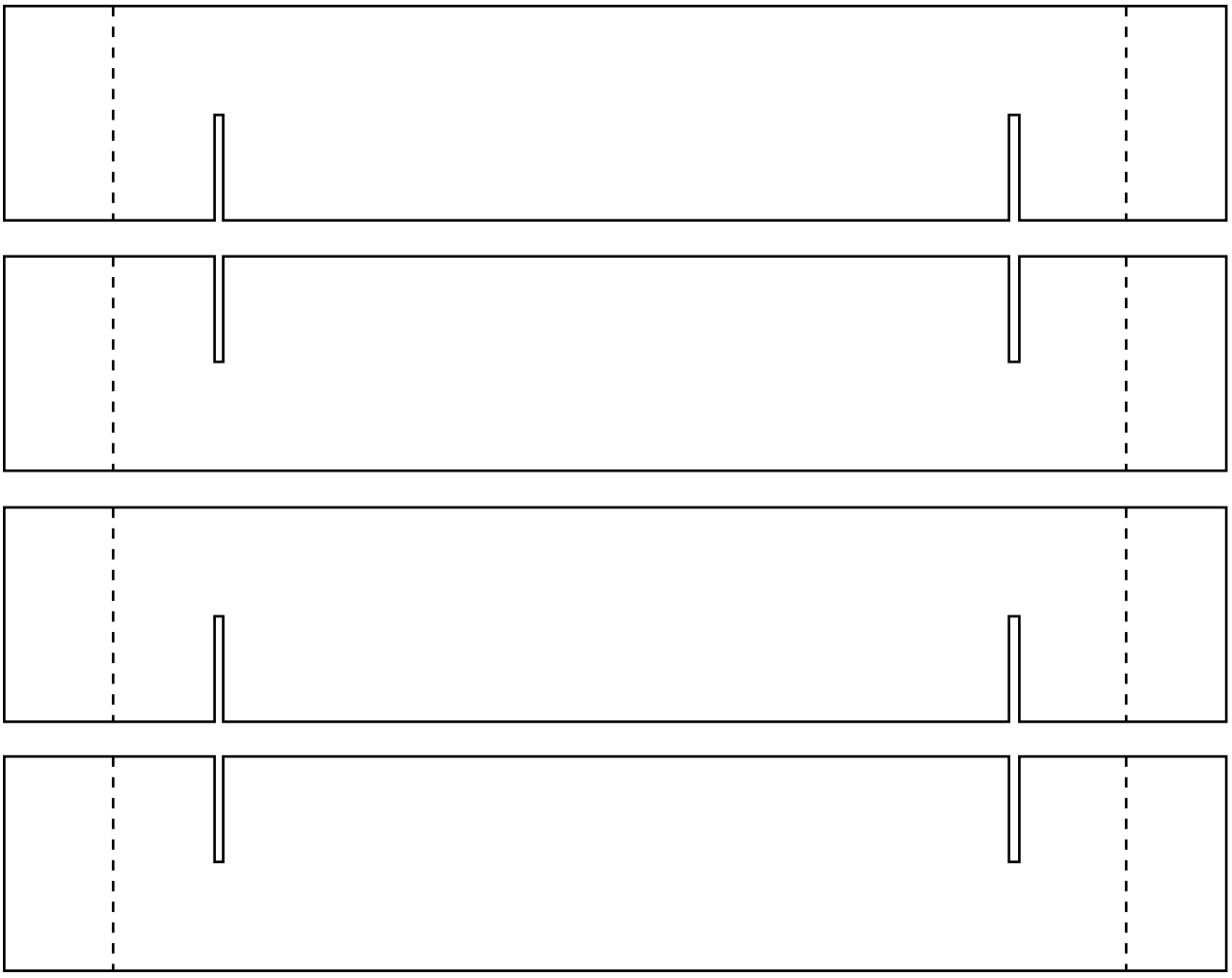


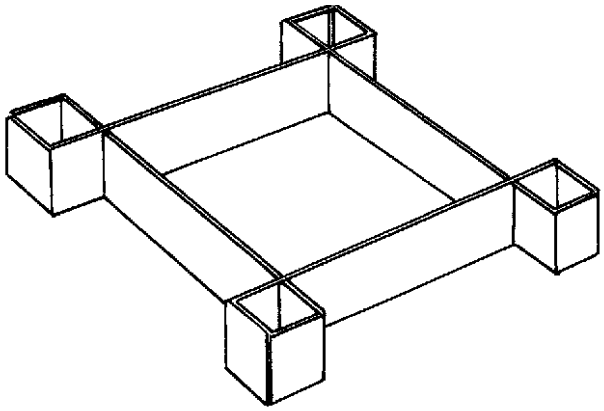


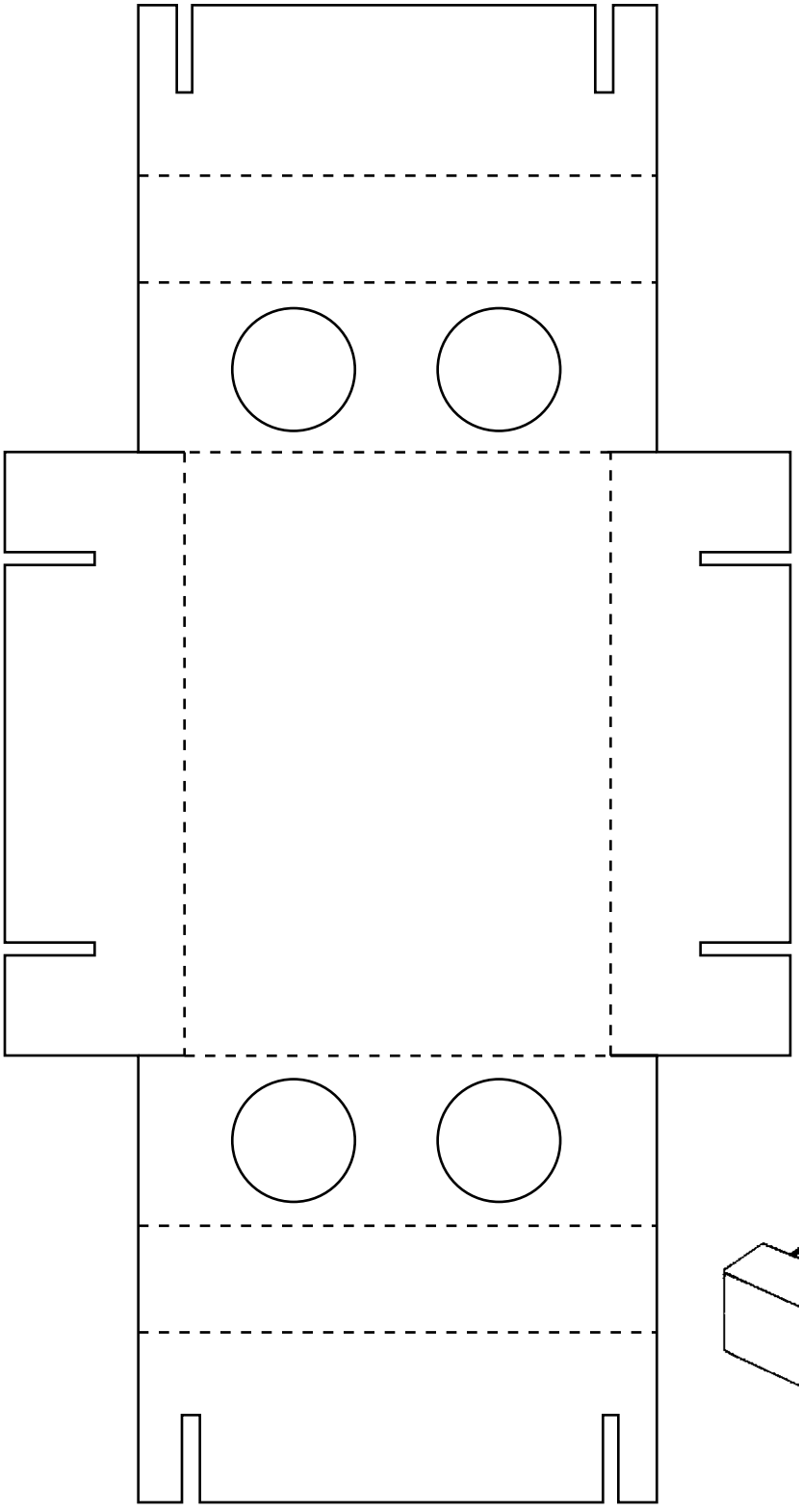


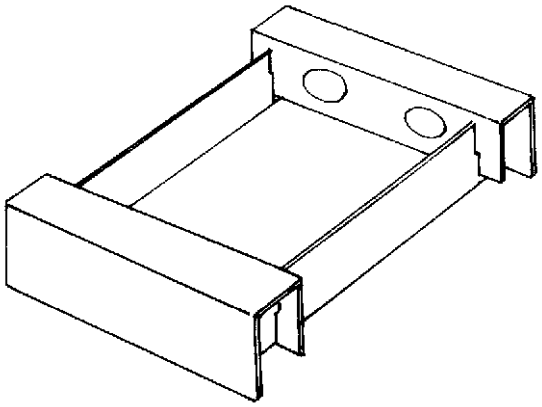




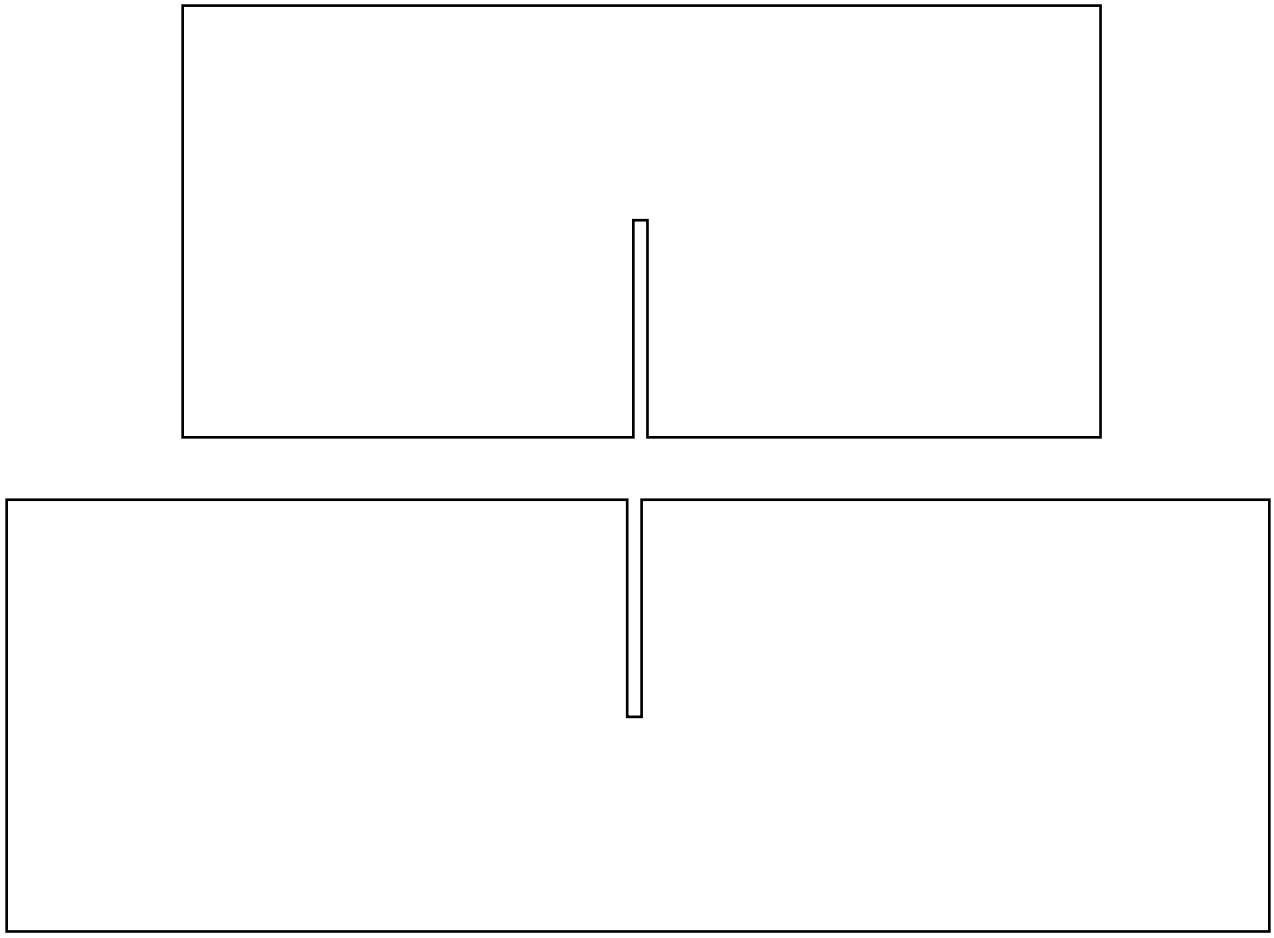


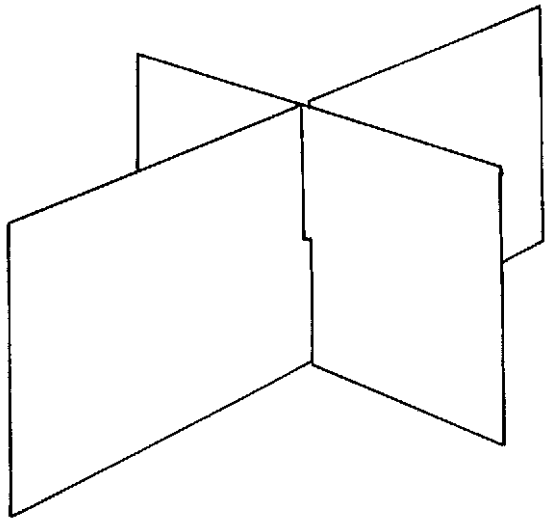


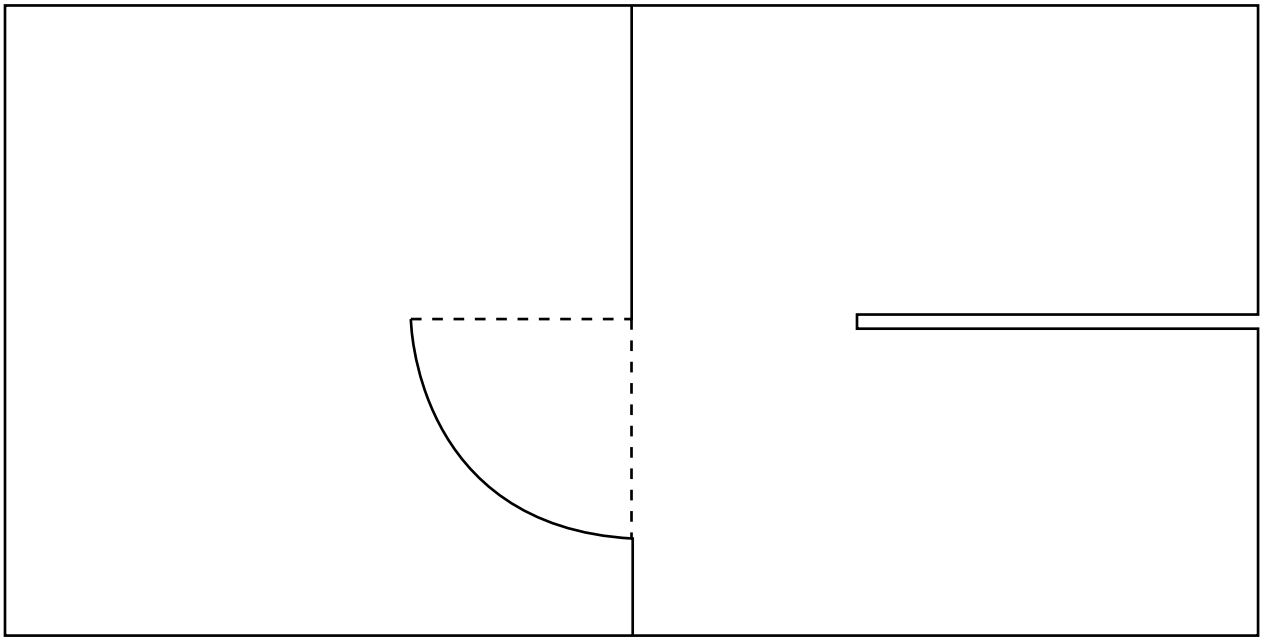


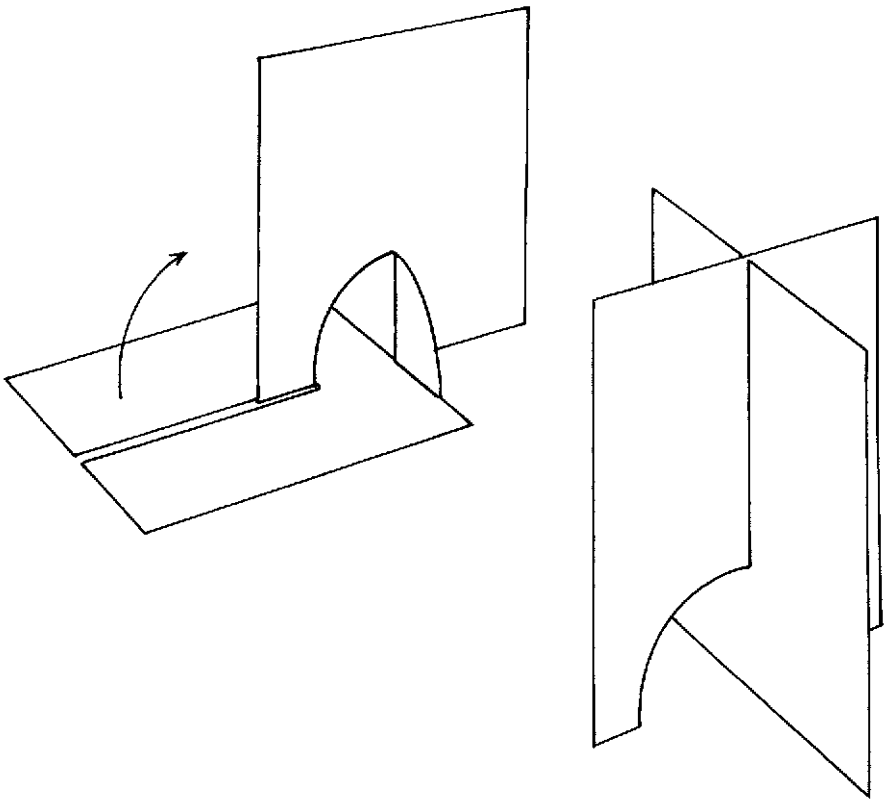


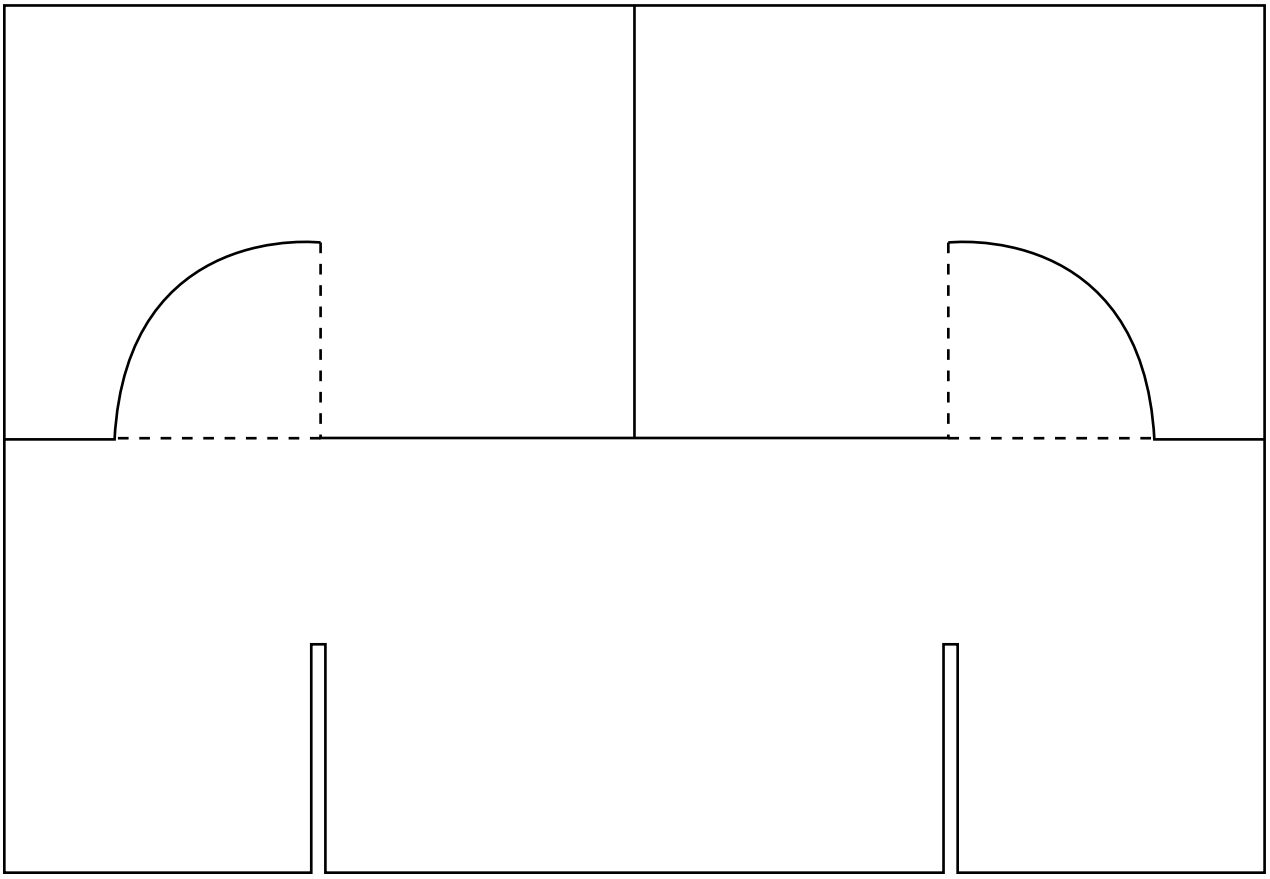
This protective cushioning device may be die-cut to conform to many different fragile objects.

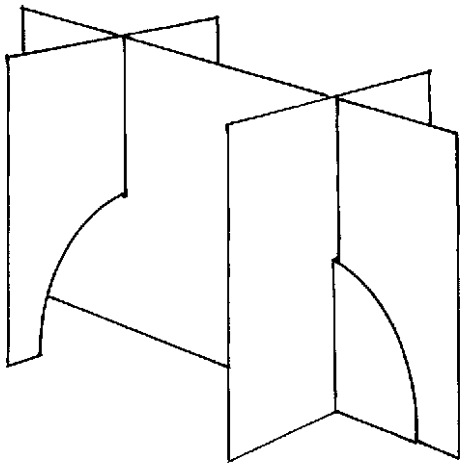


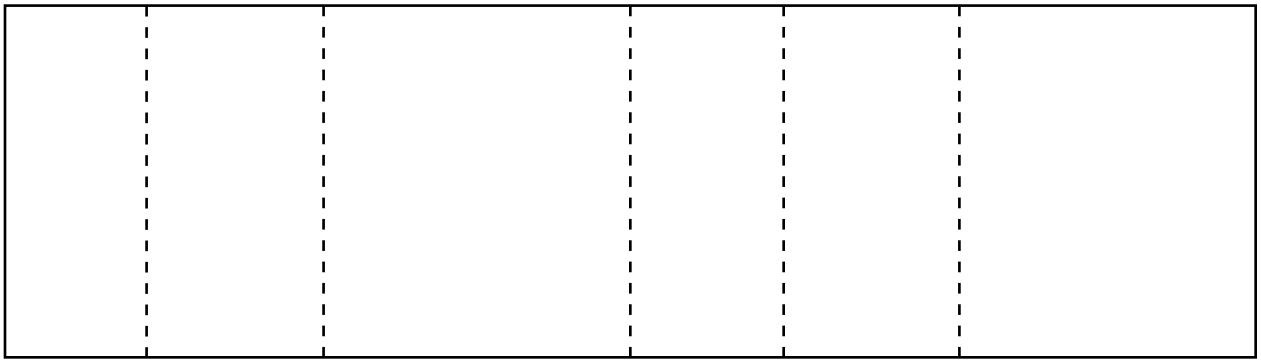


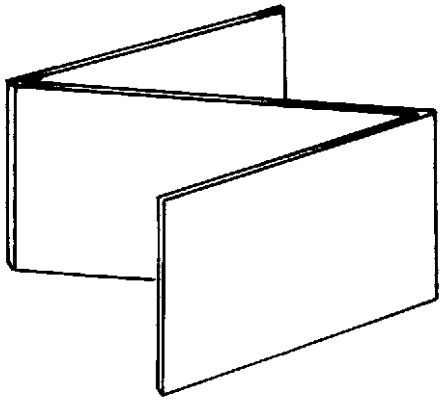


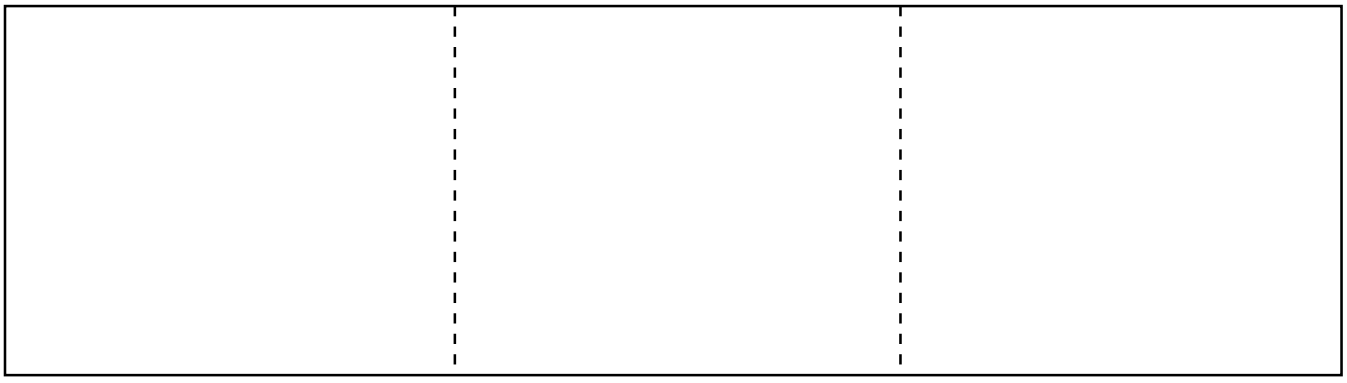


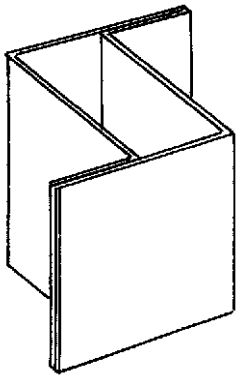


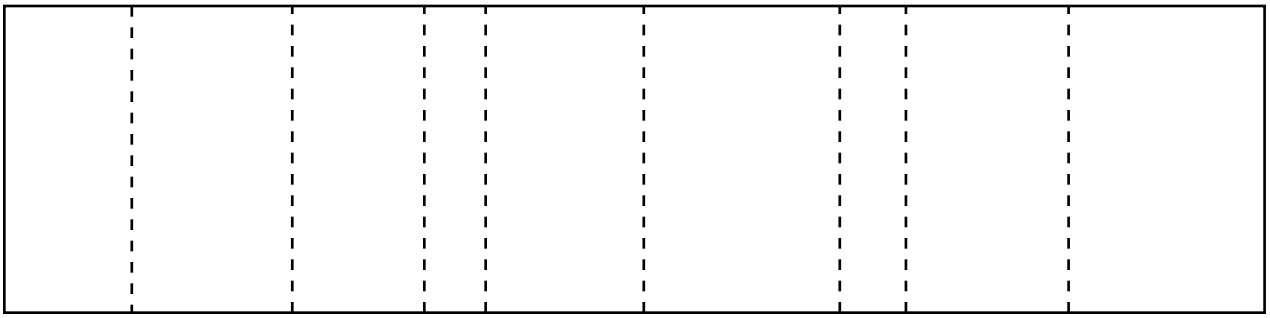


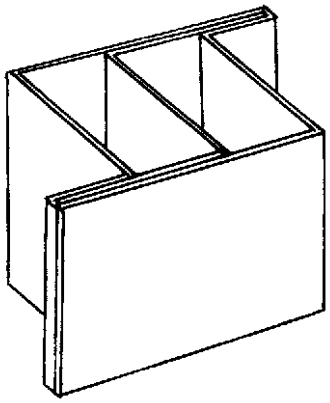


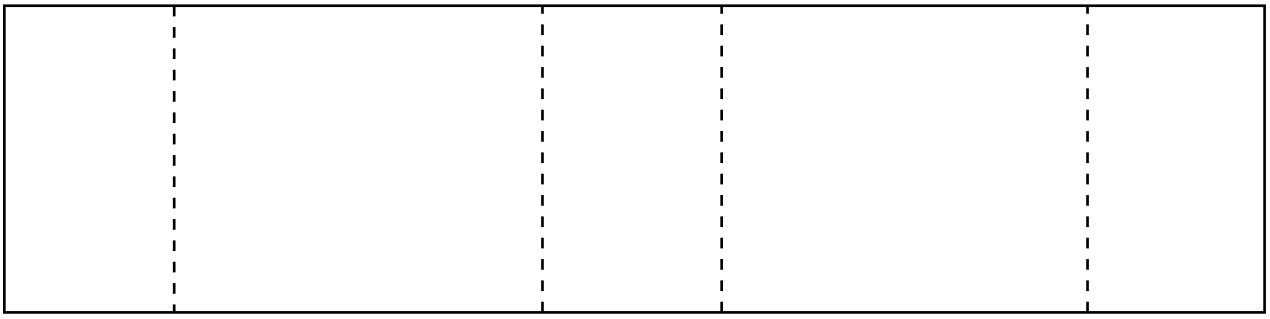


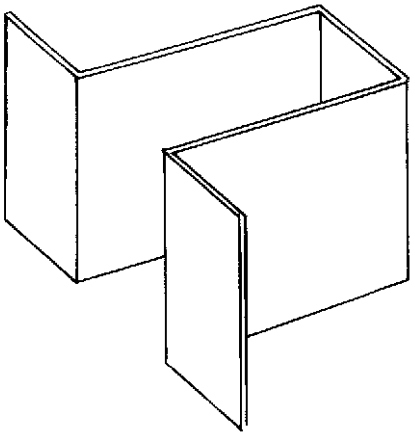


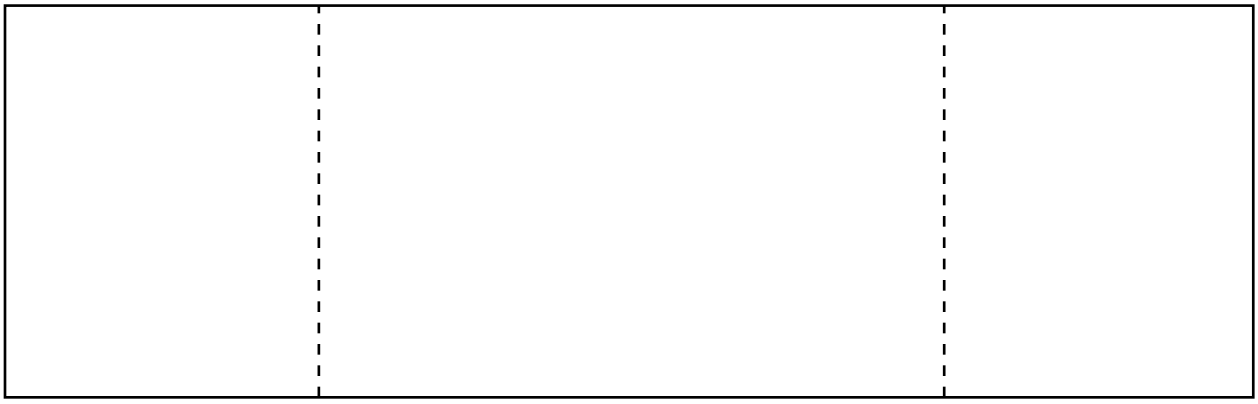


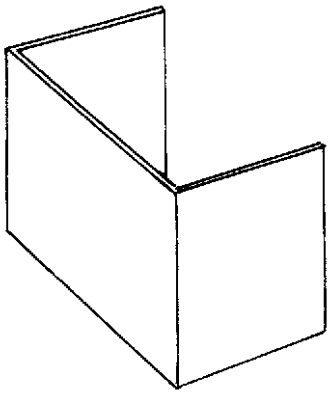


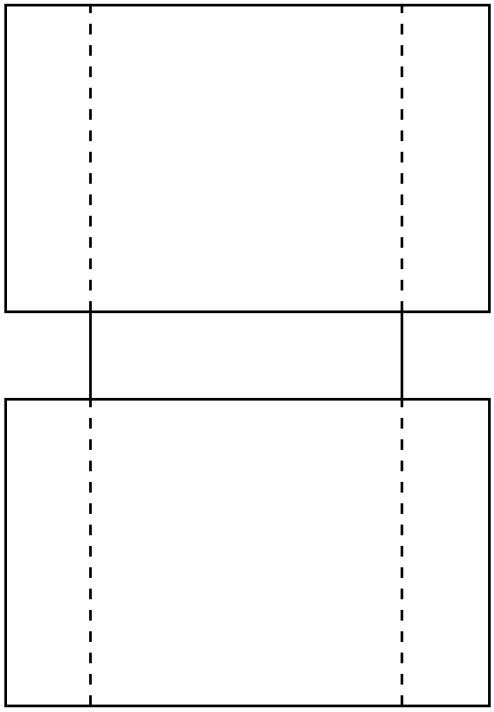


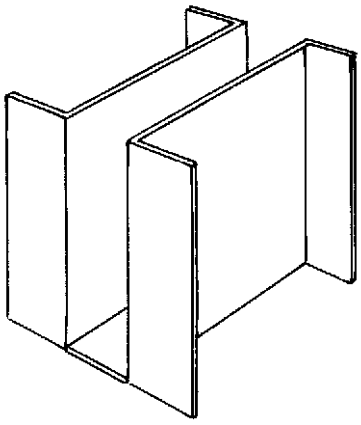


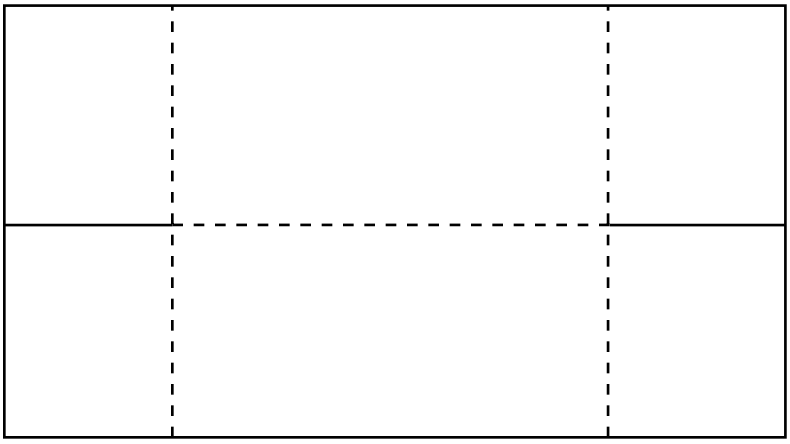


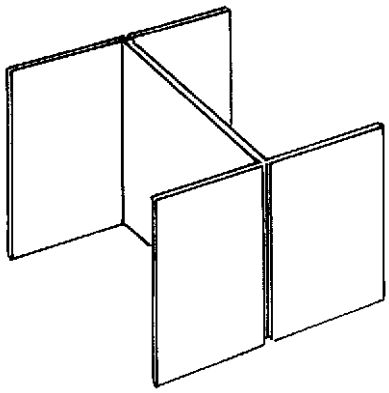


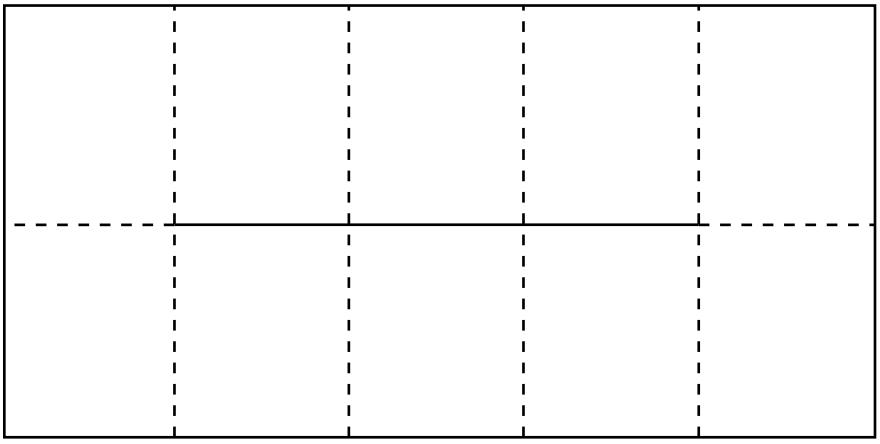


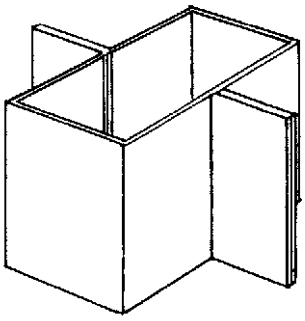


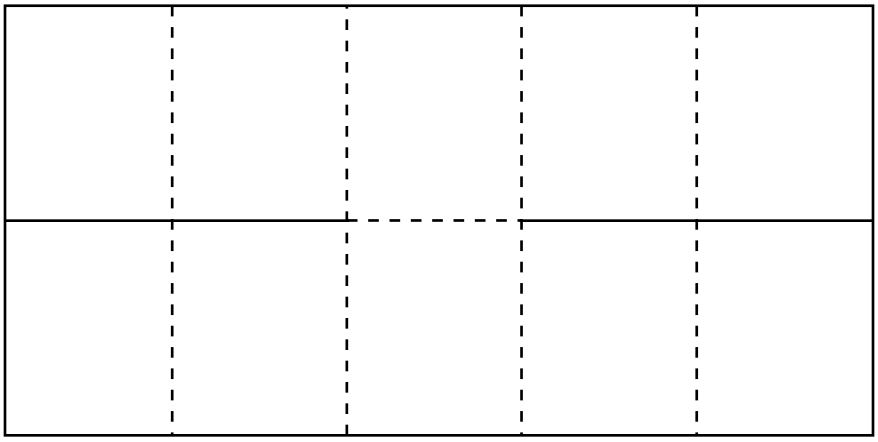


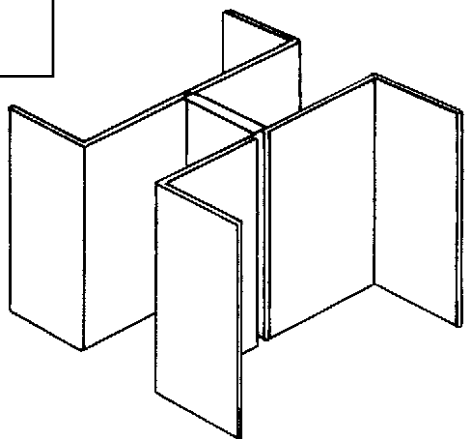


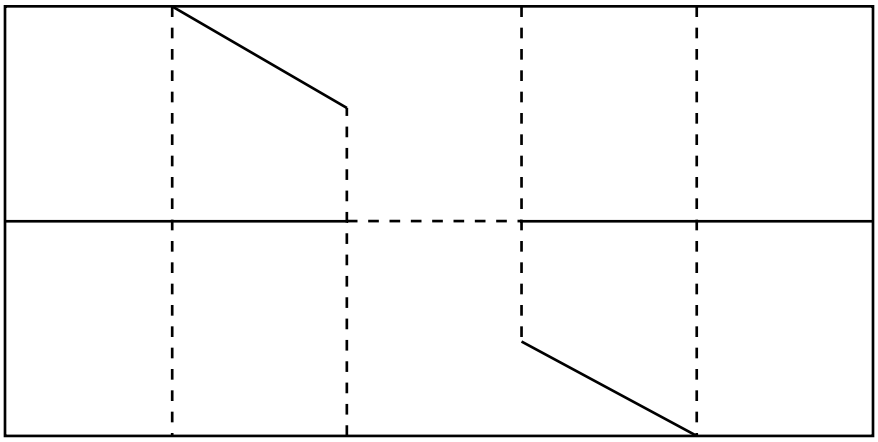


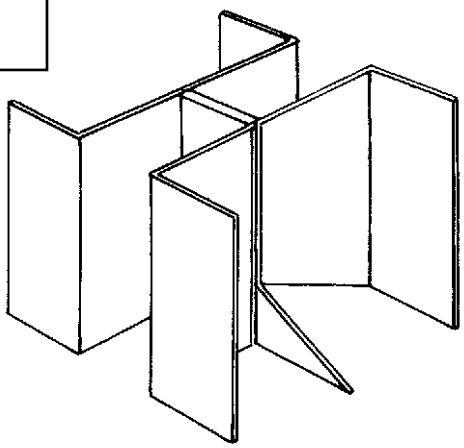


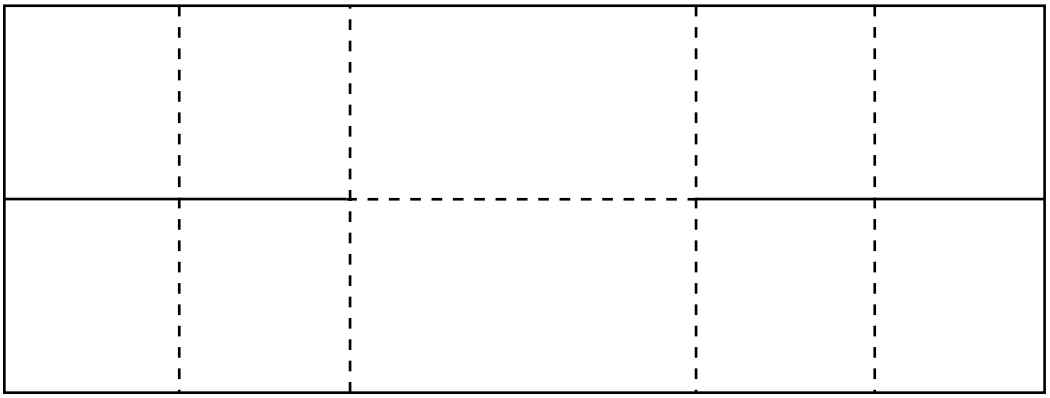


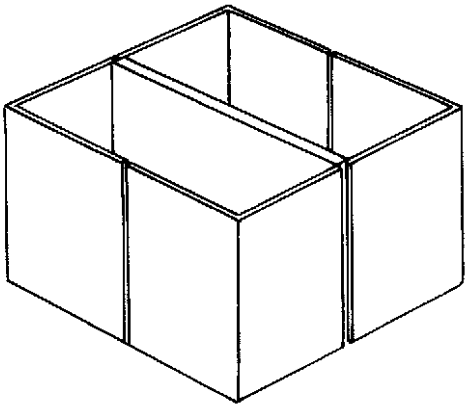


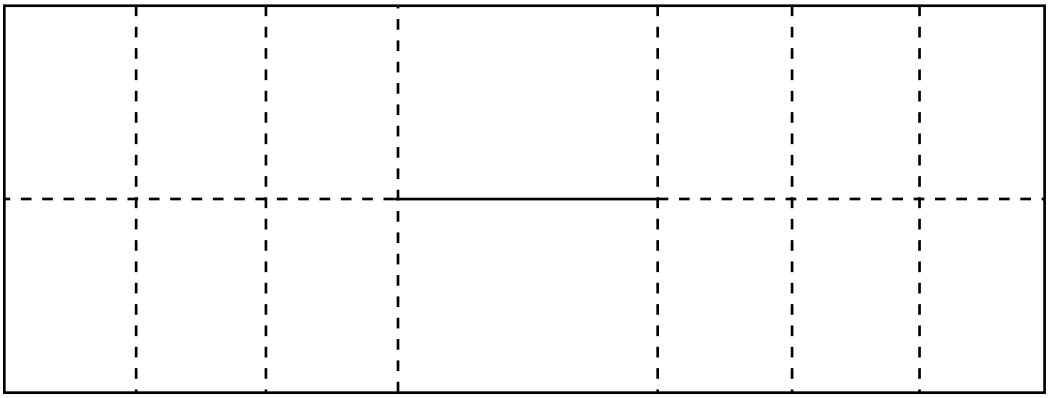


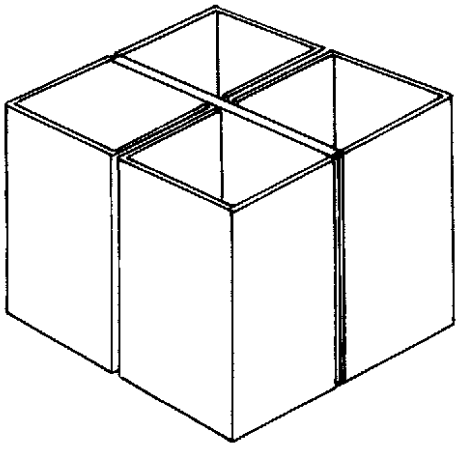


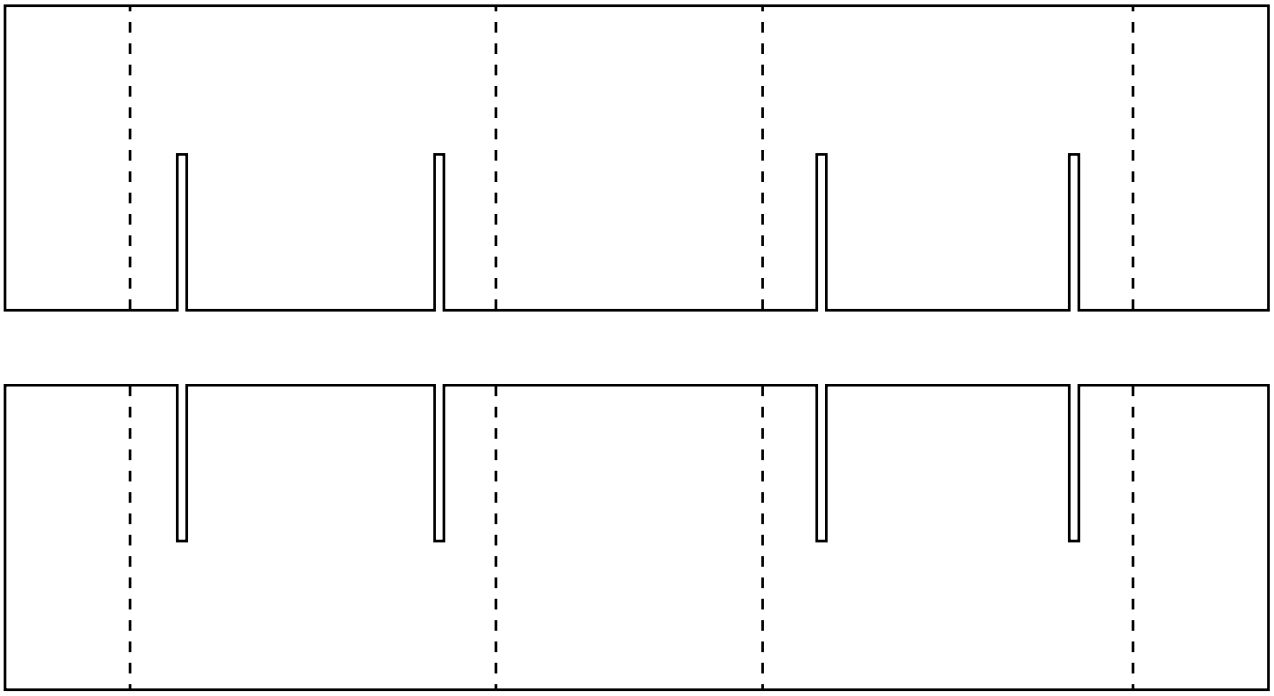


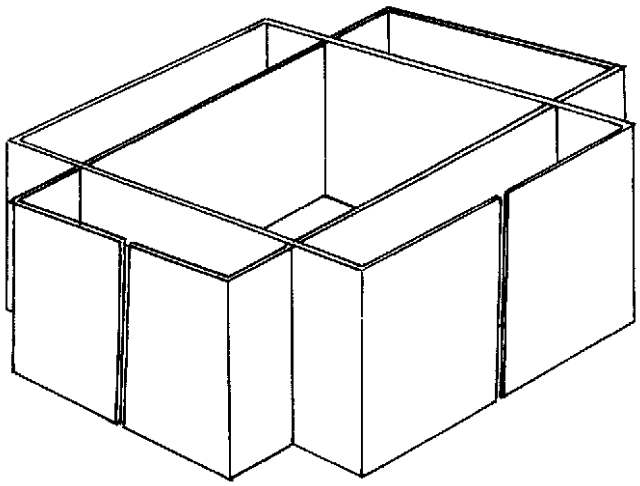


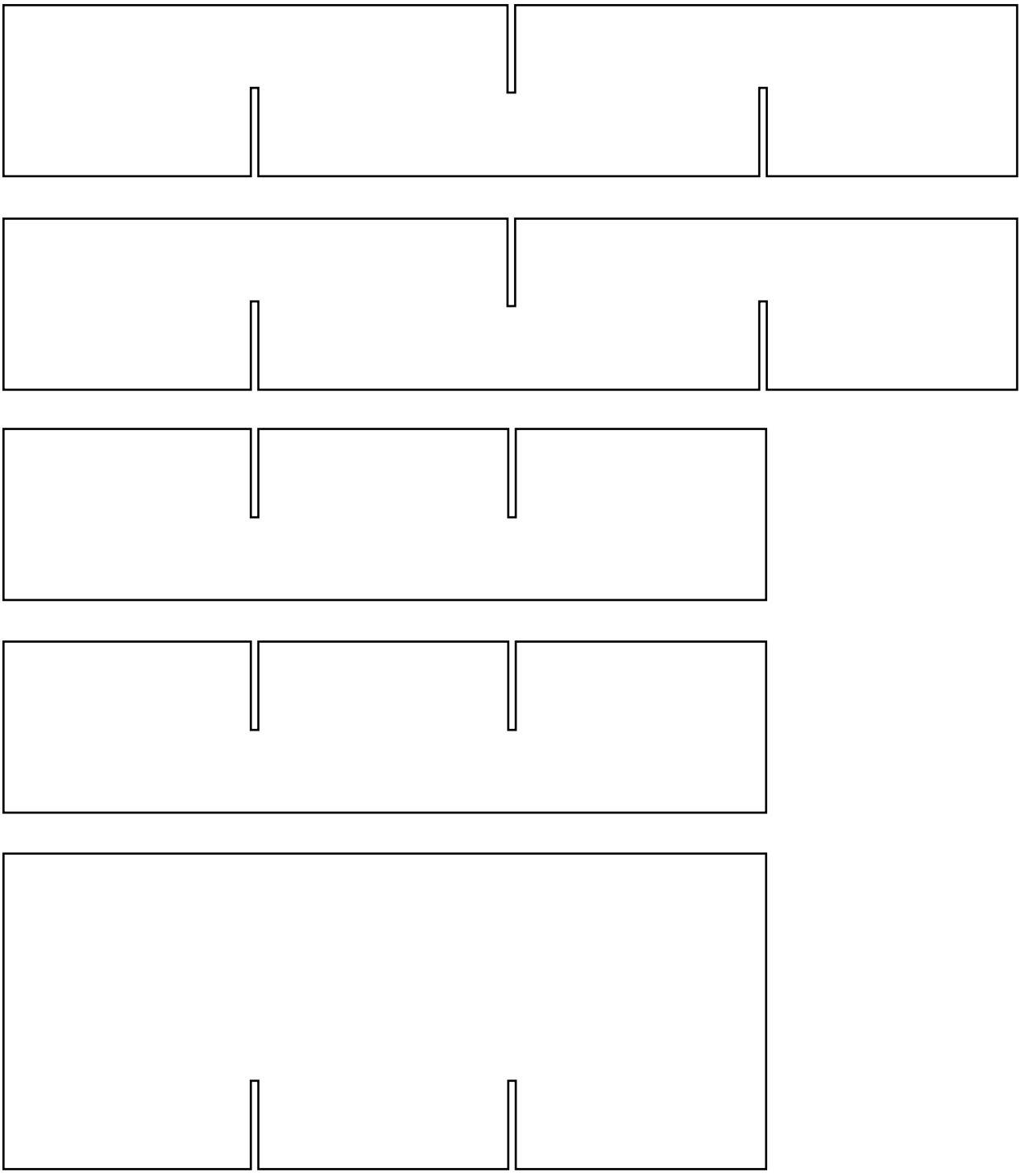


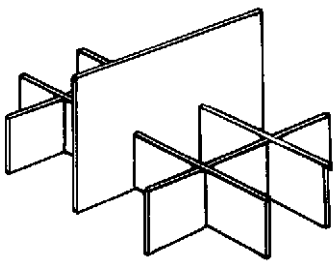


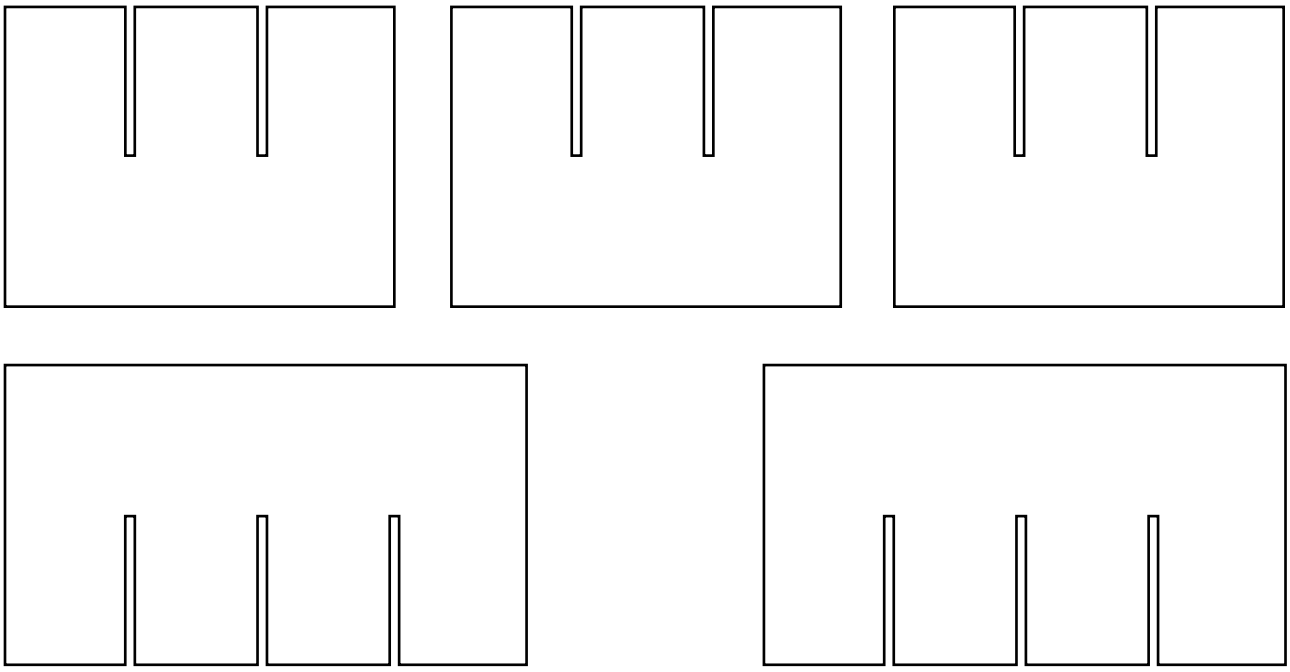


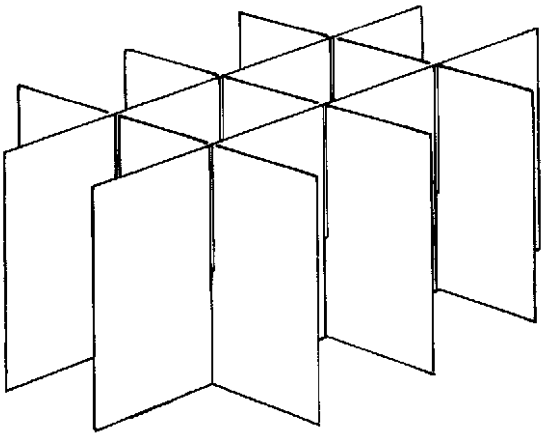


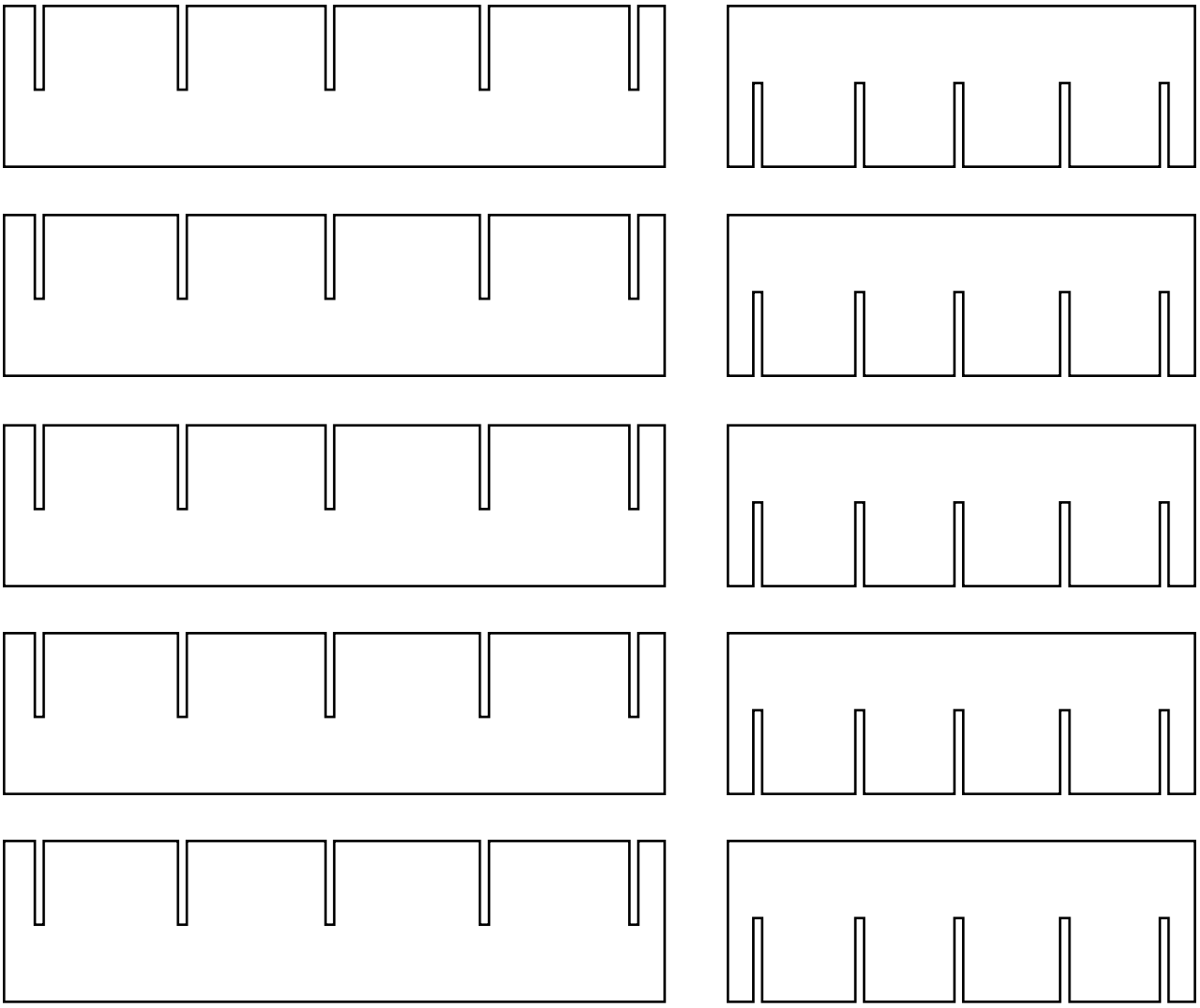


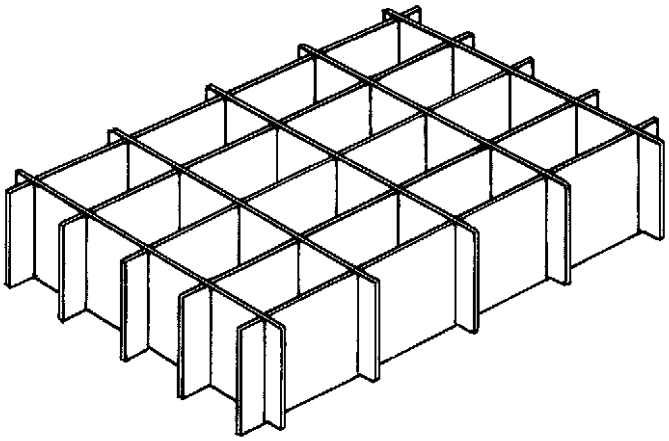


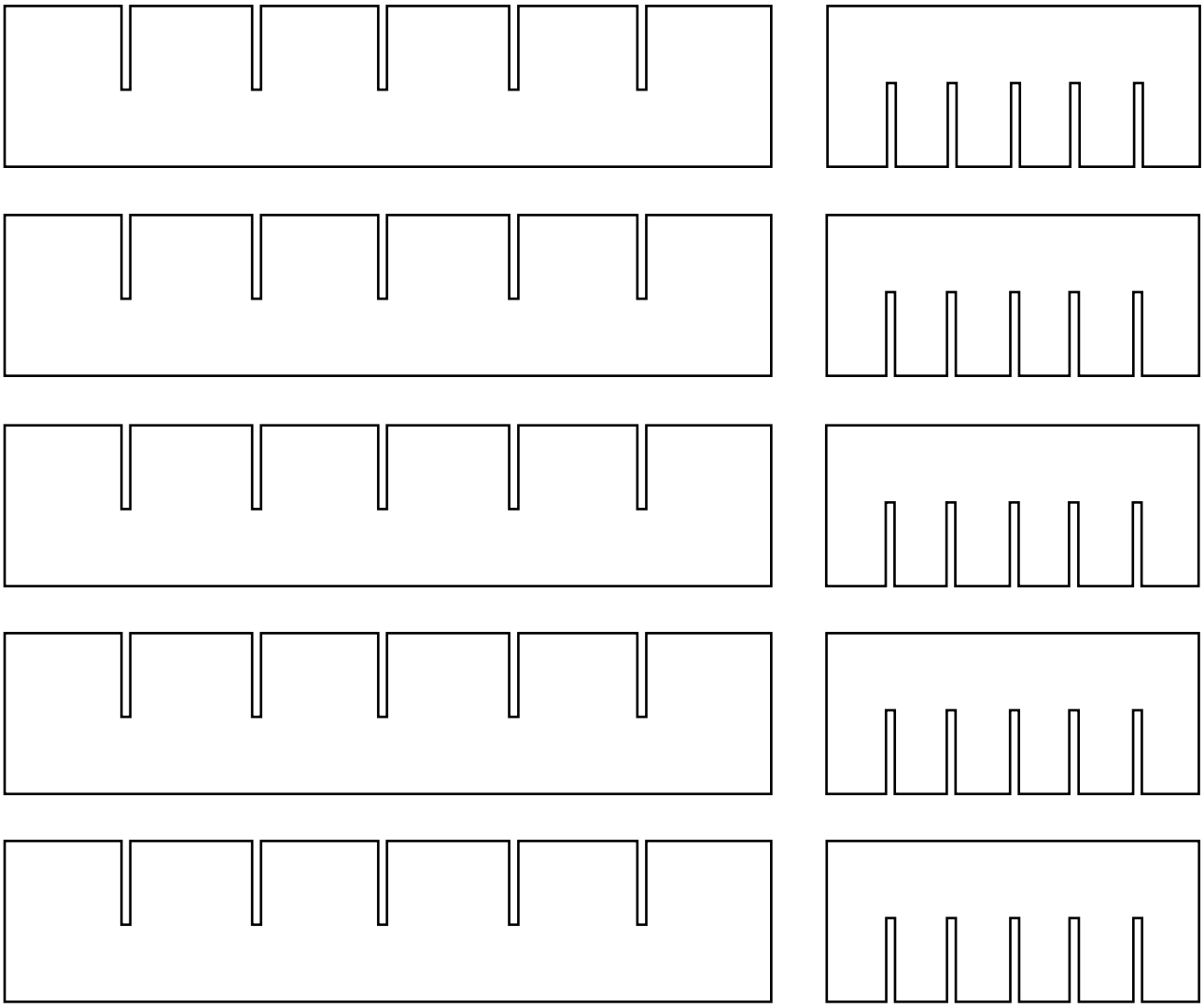


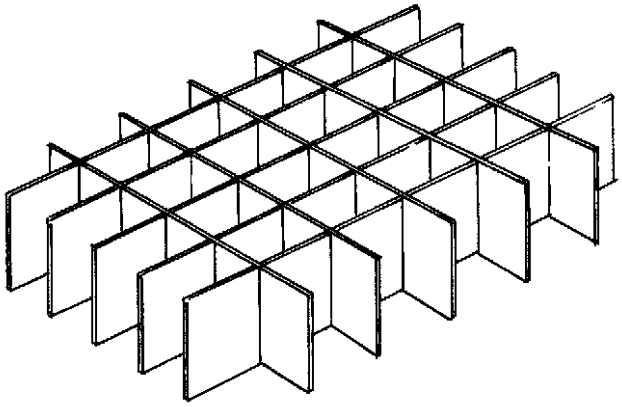


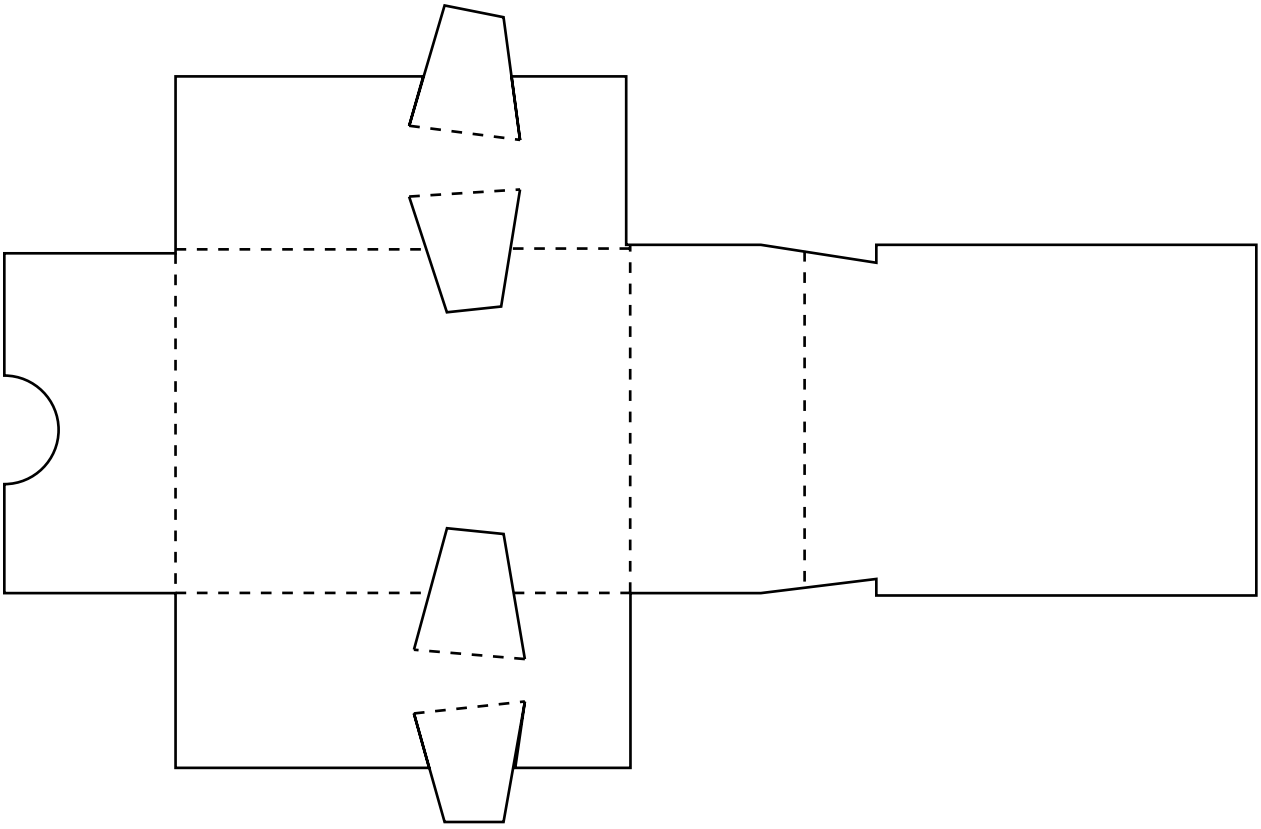


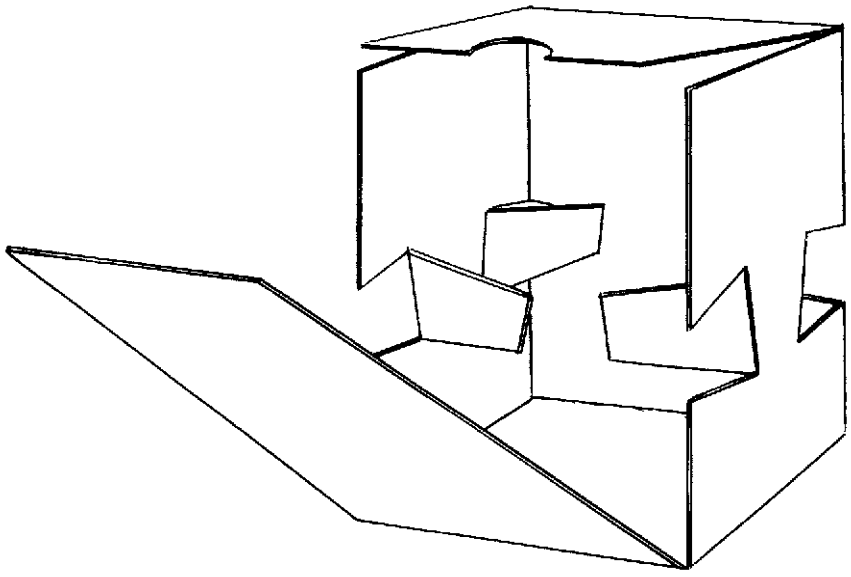


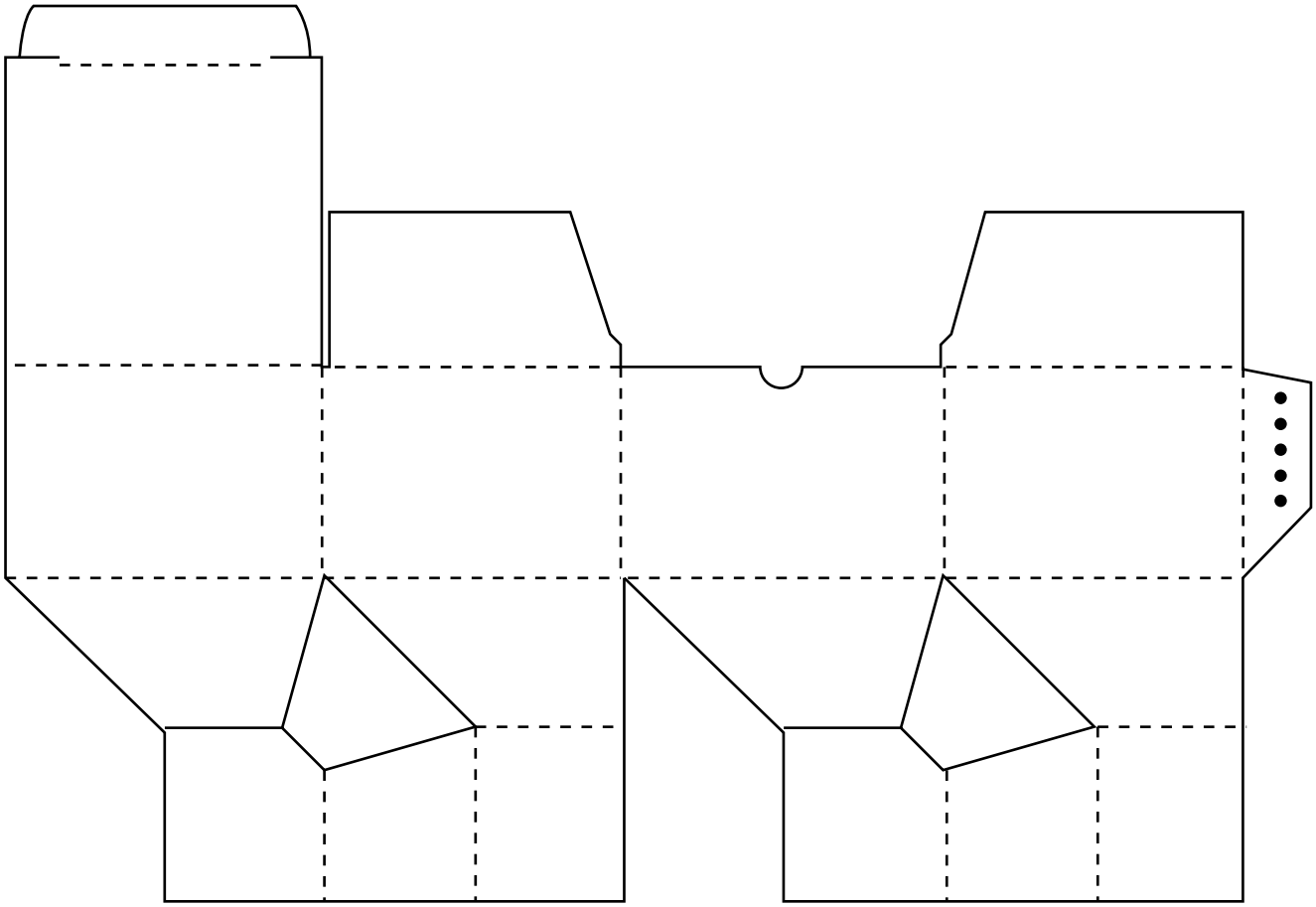


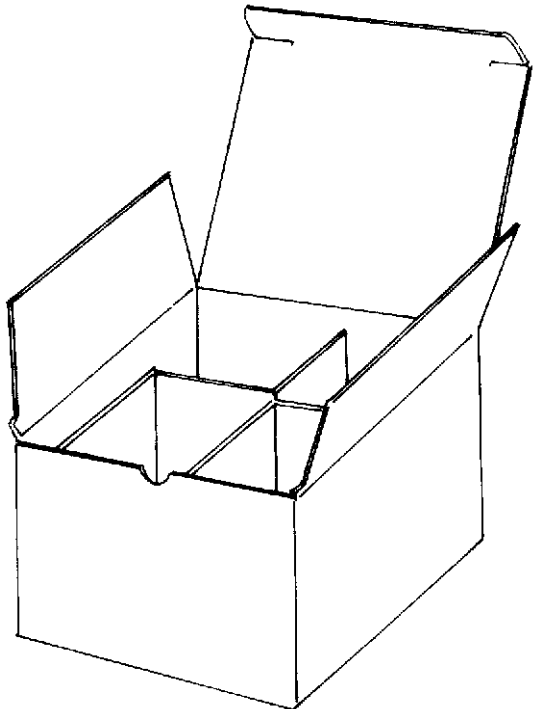


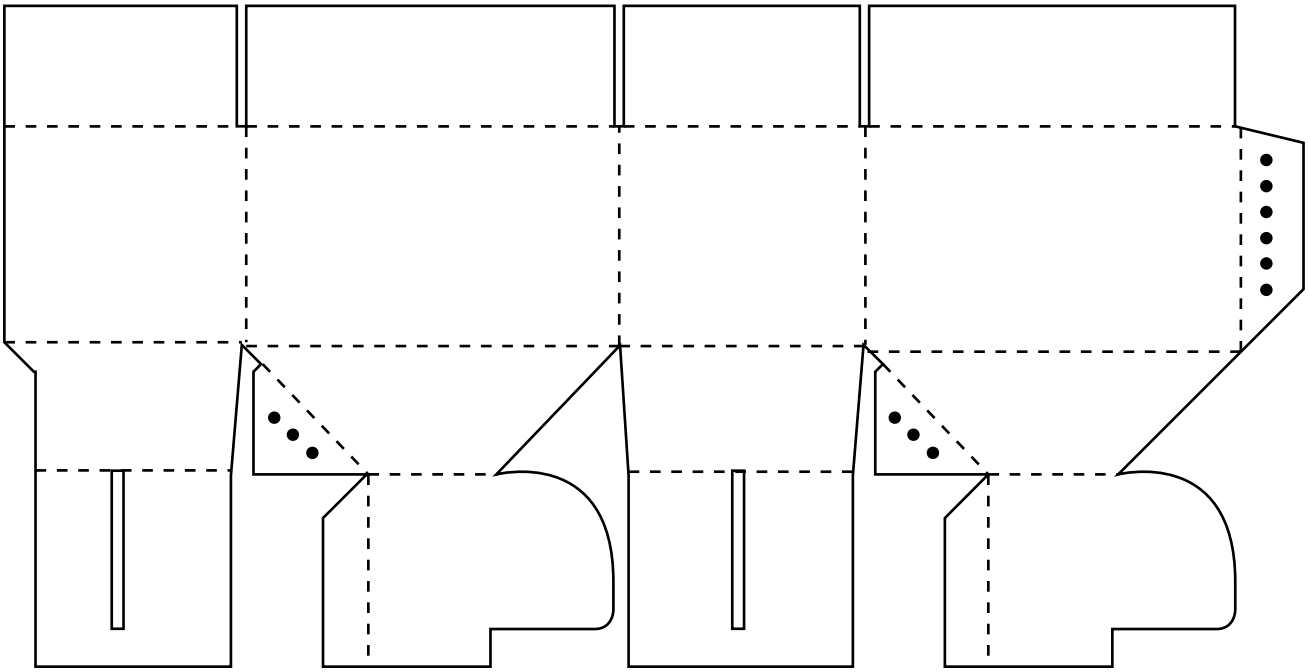


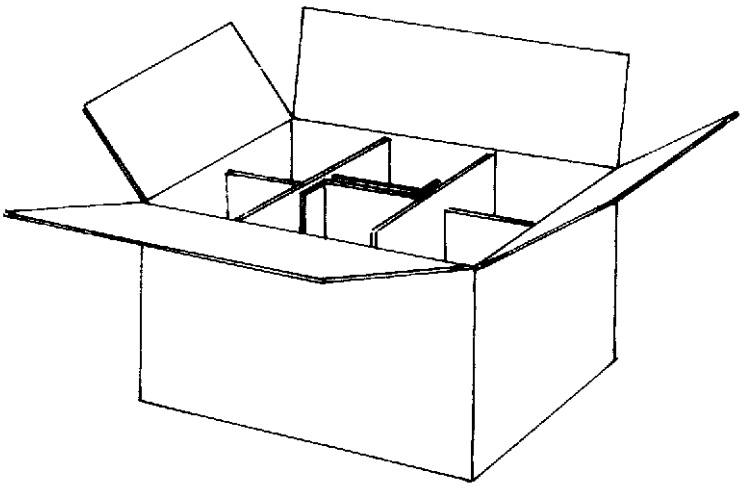


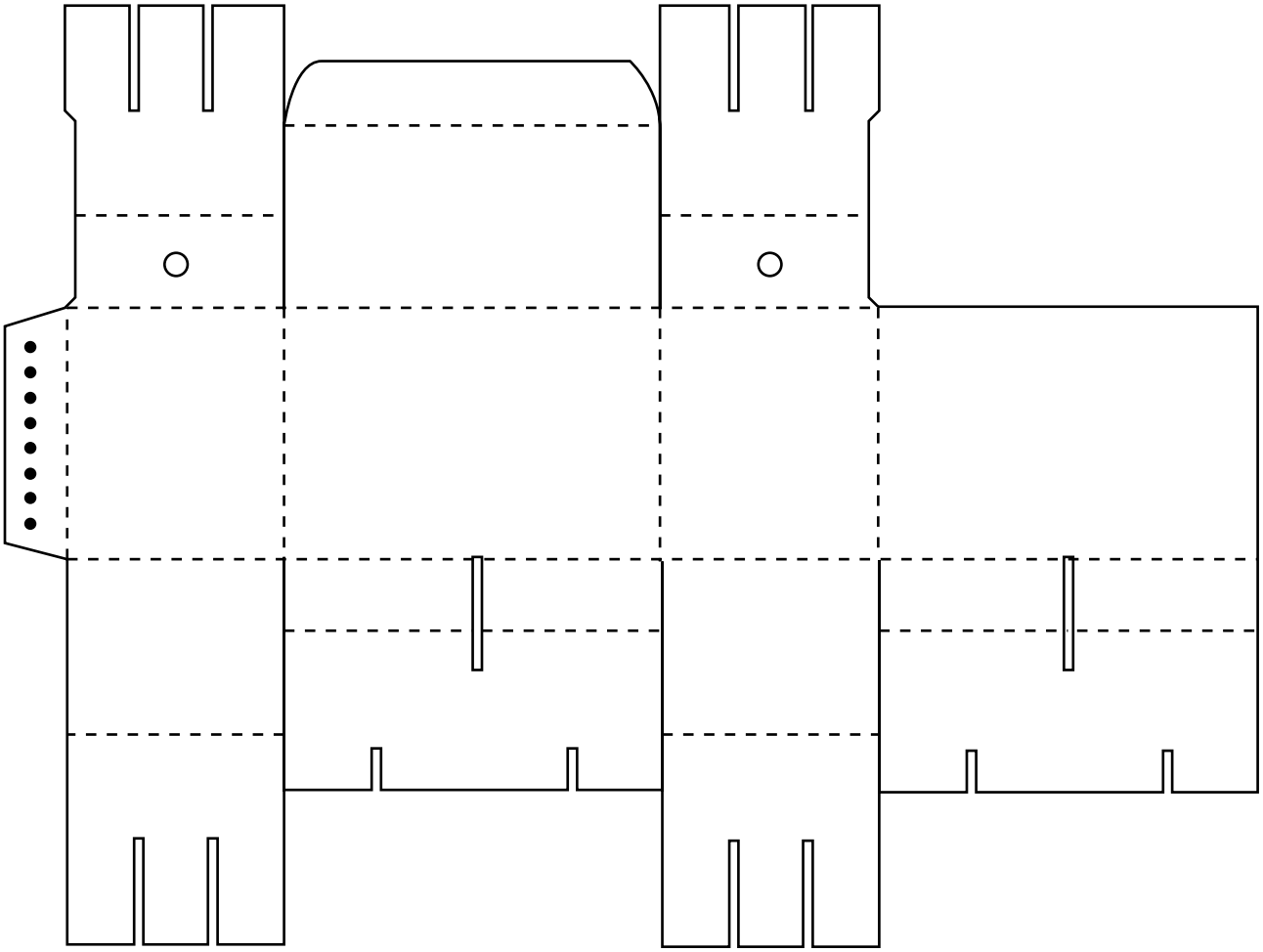


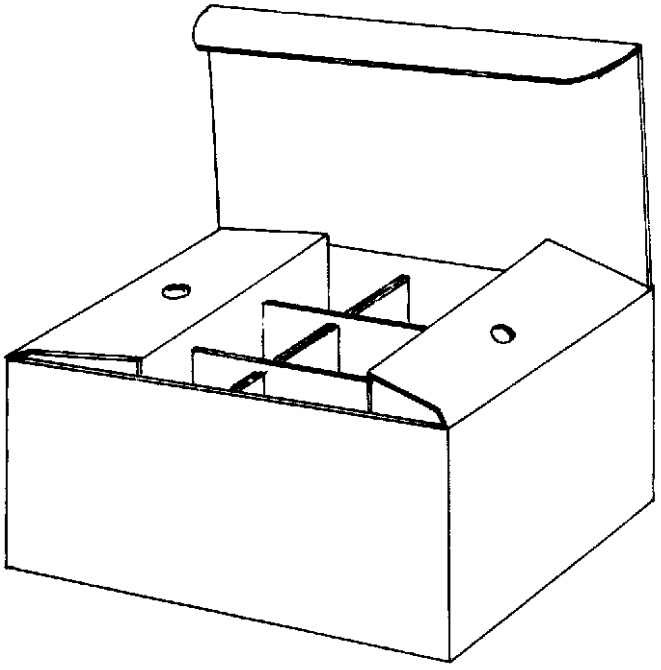


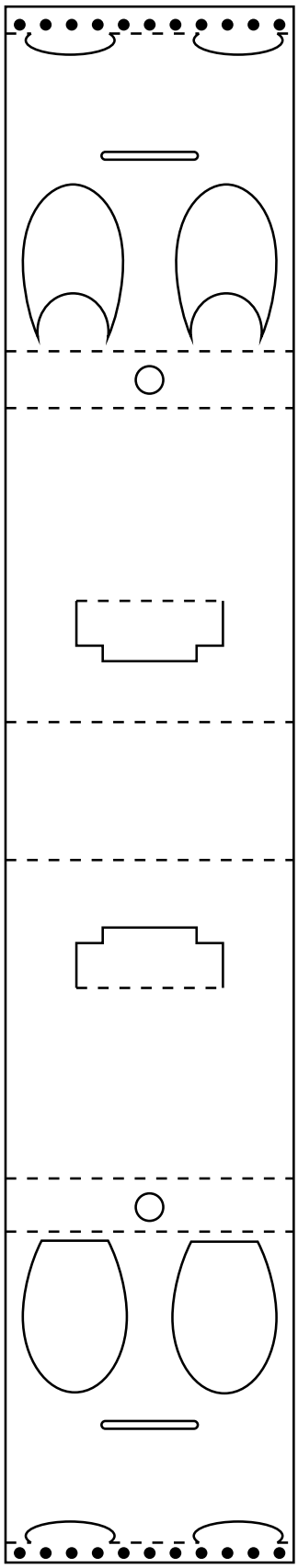


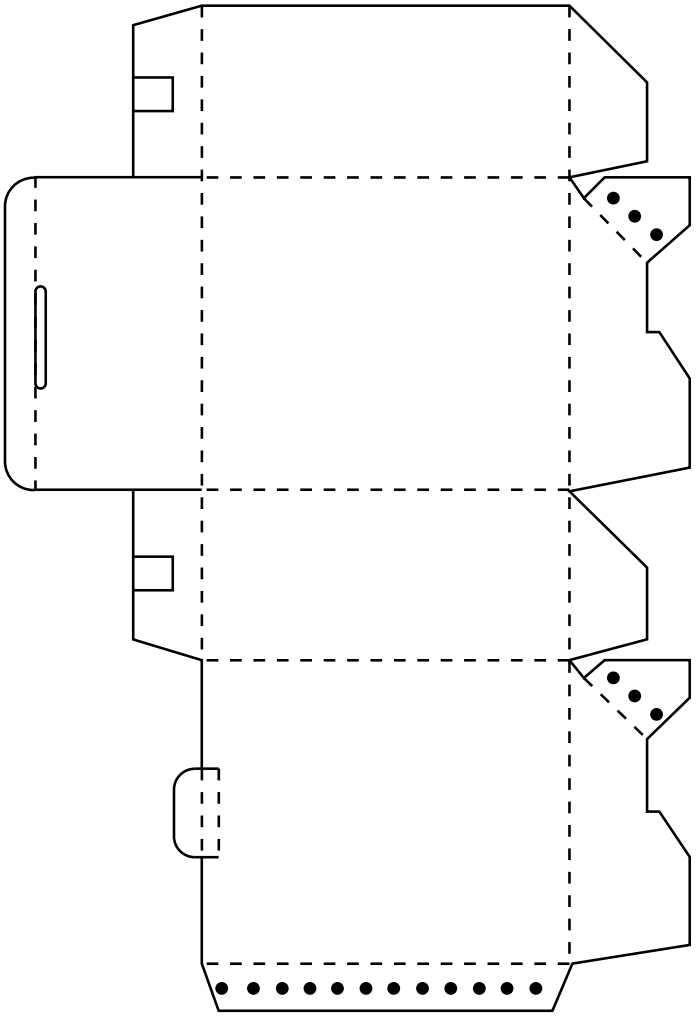


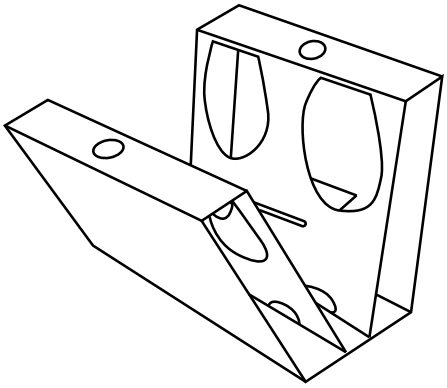


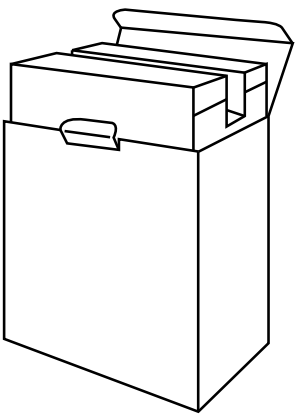


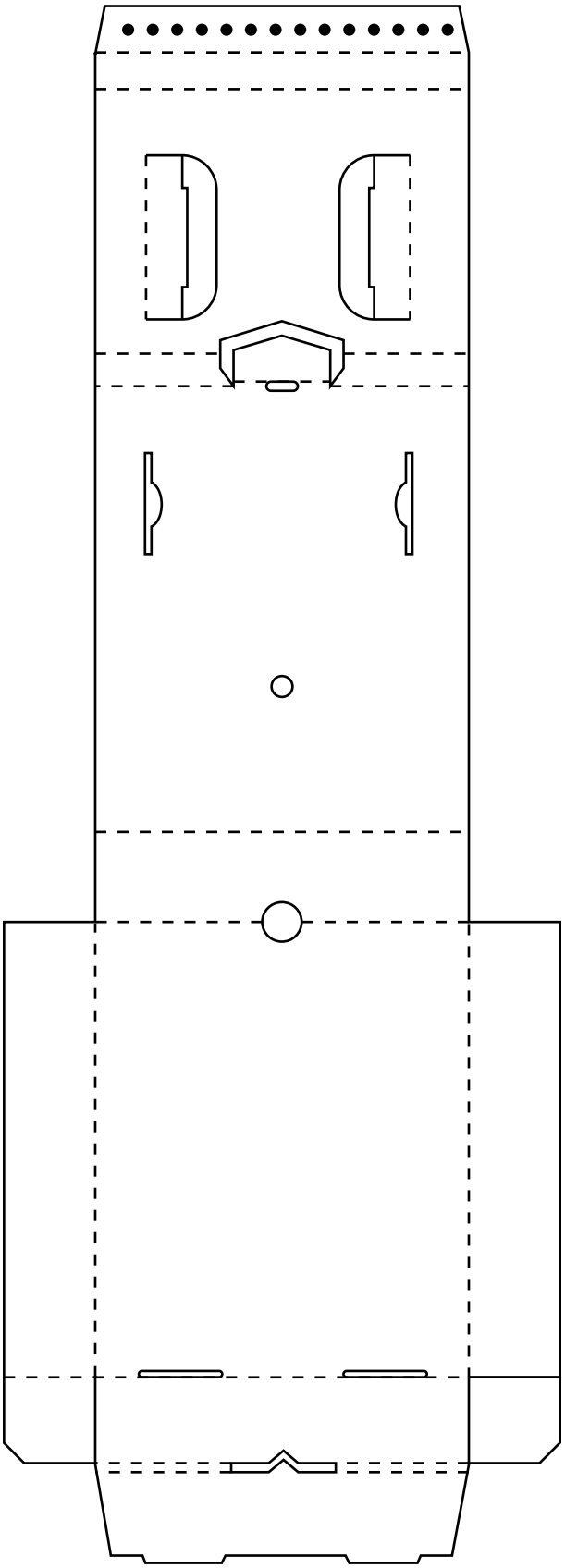


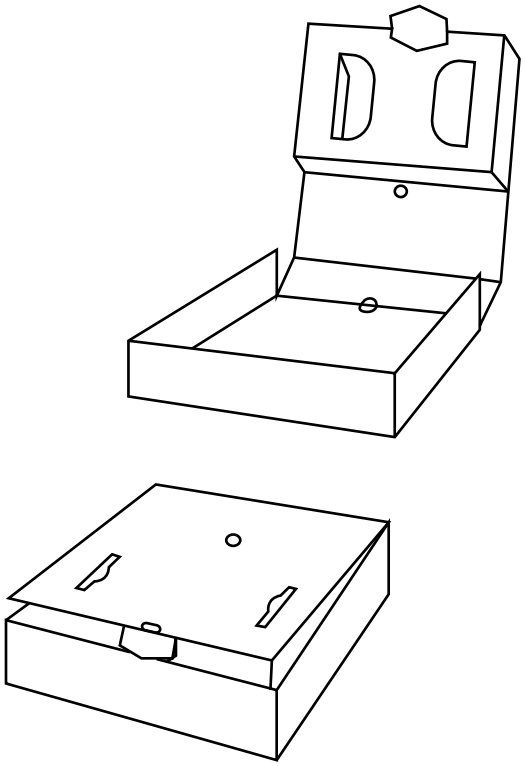




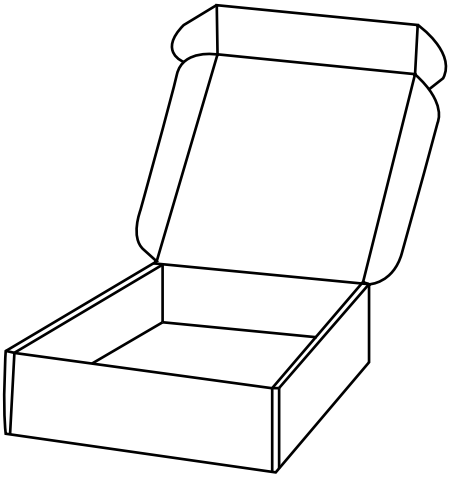


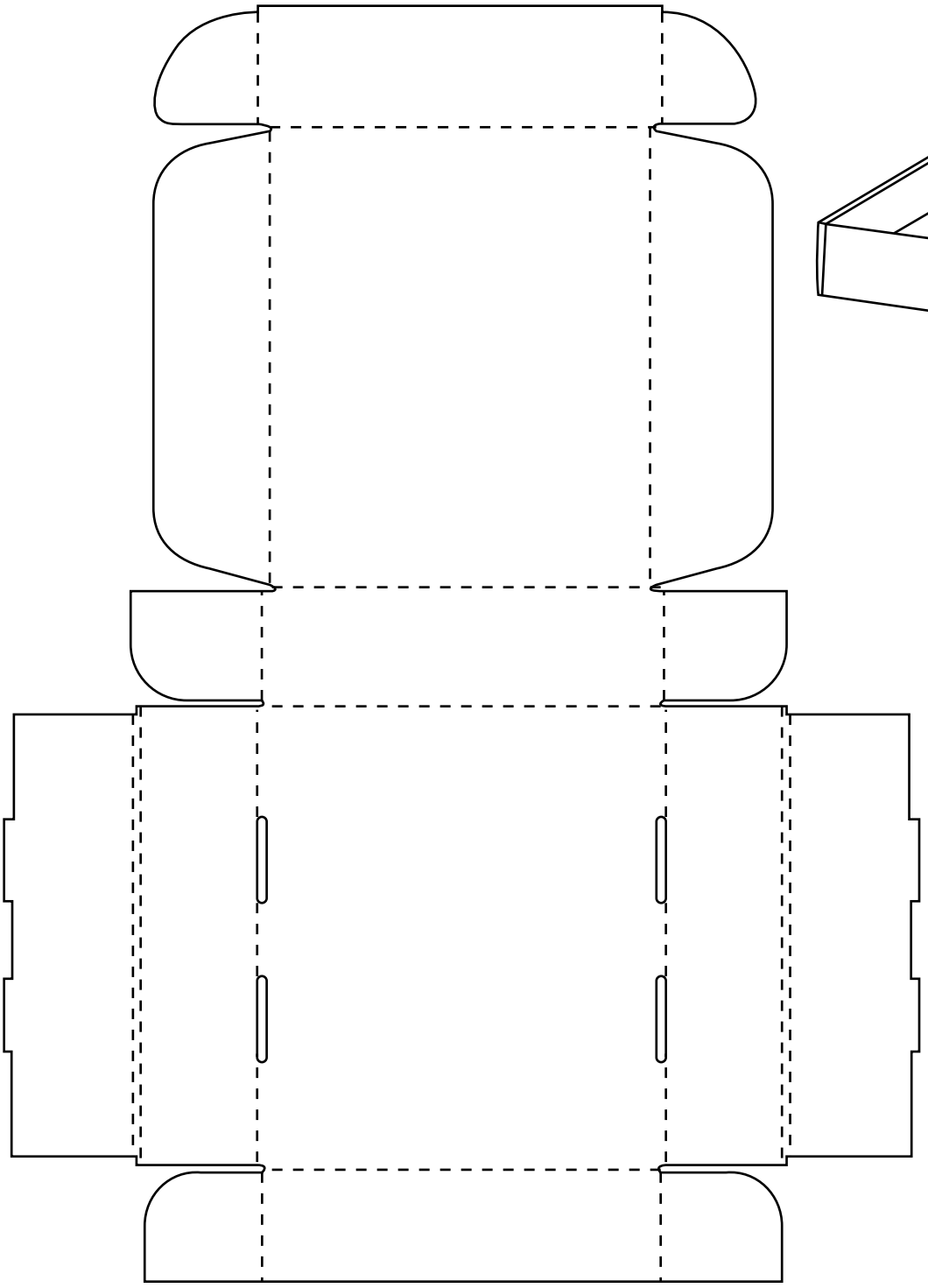


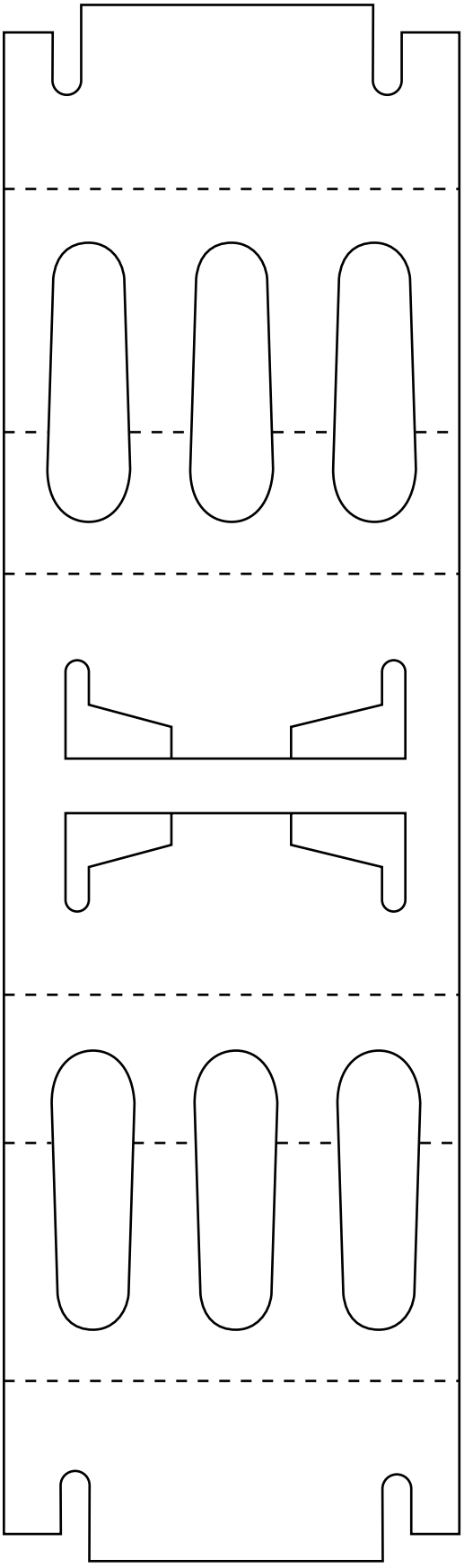


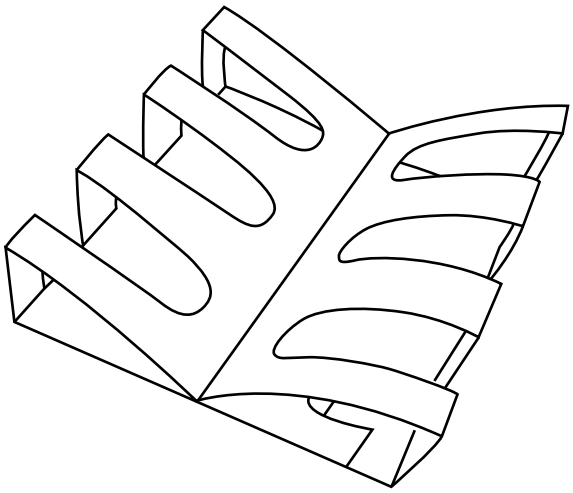


A computer program CD plus instruction manual wrap suited for the mailer on the following page

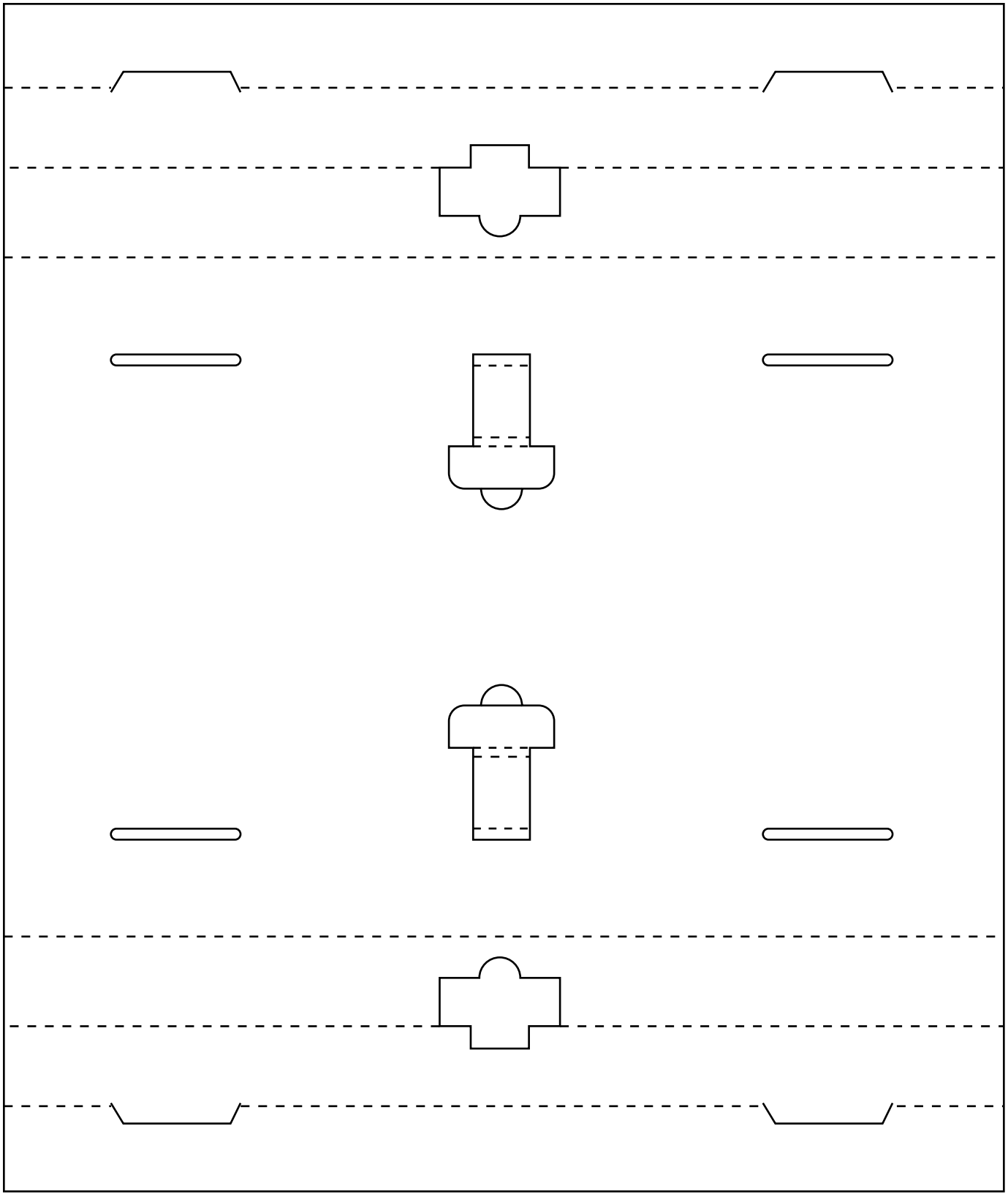


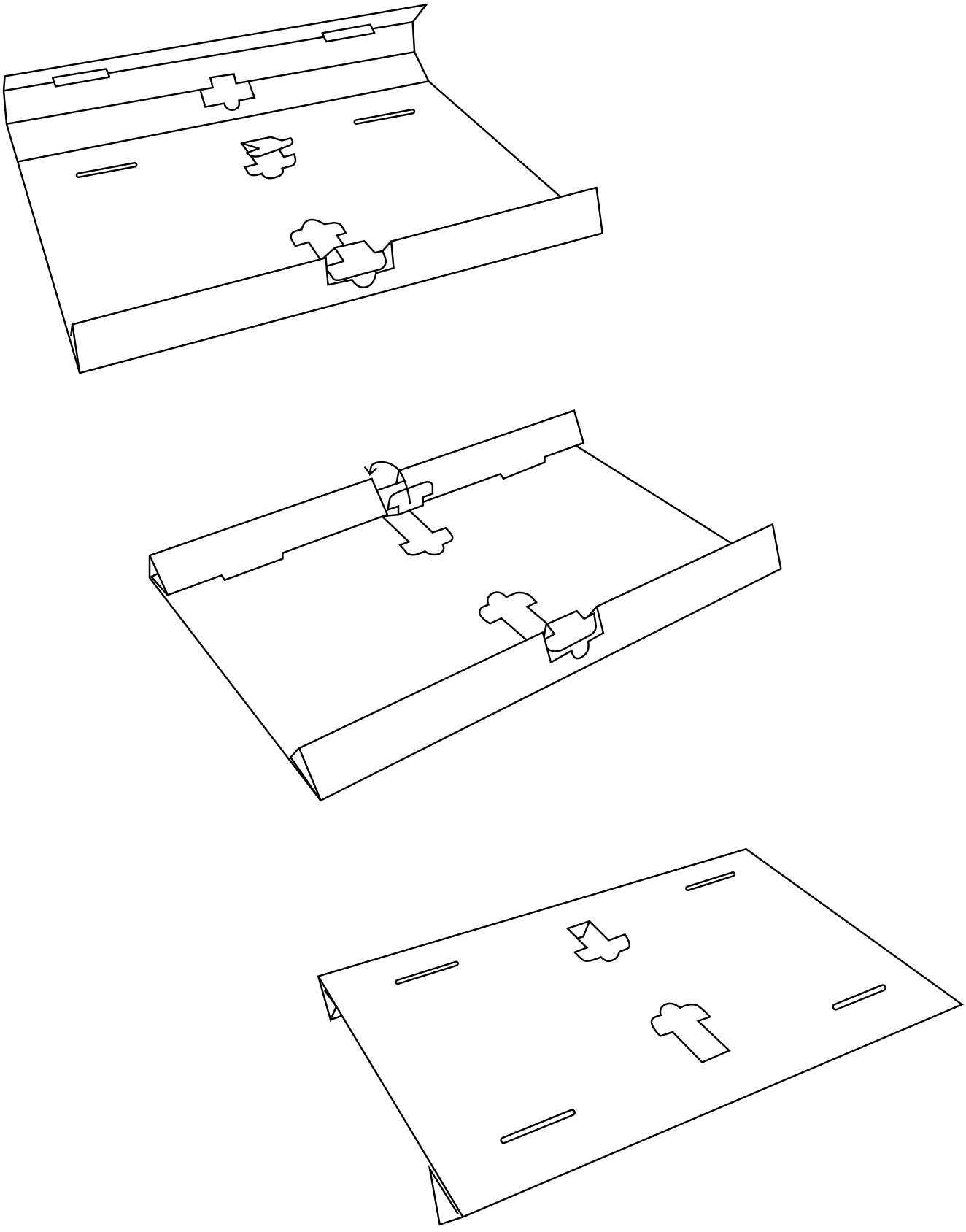






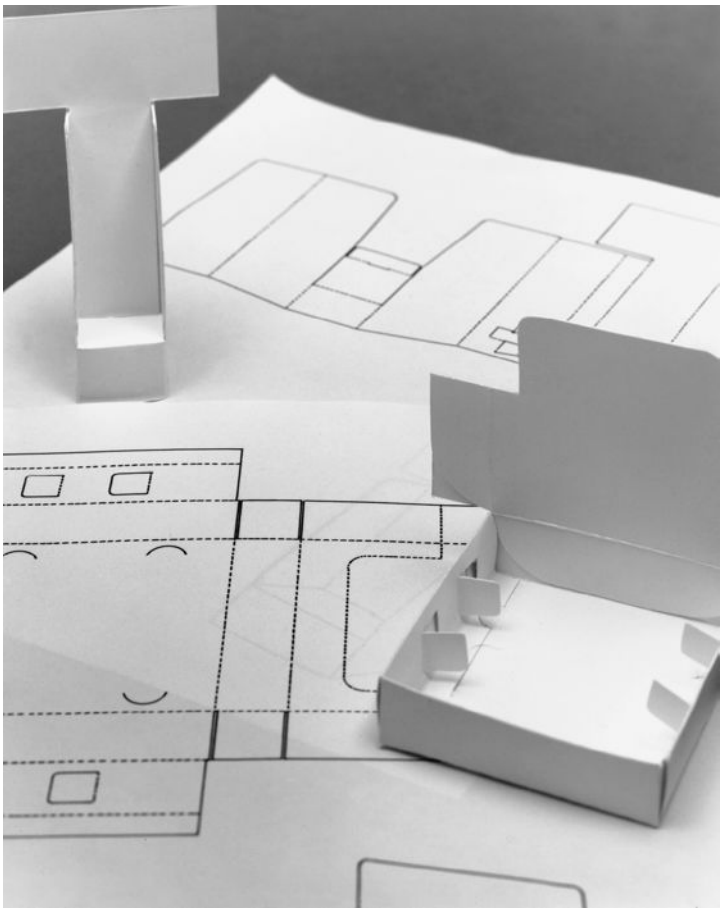
This spacer is inserted into a corrugated shipping carton to separate young plants.





5

Point-of-Purchase Displays



Die-cut three-dimensional displays first appeared in 1910, and photographic full-color displays made their appearance in the late 1920s. With the development of new plastic materials and techniques, point-of-purchase (P.O.P.) displays can now be produced in a variety of styles for practically all consumer products. With the rapid growth of many industries and the increasing variety of products, the point-of-purchase display has become an ever more effective selling aid for retailers.

The expansion of self-service stores and changes in consumer buying habits have also contributed to the development of P.O.P. materials. The modern retail establishment is a busy place in which a large percentage of selling is accomplished through self-service; consumers choose merchandise themselves rather than having it brought to them by salespeople. Often, unplanned buying decisions are made in the store, and an effective, well-designed display may be the deciding factor in a consumer's choice.

Planning and designing a P.O.P. display is a complex job involving a variety of materials and technologies. Paperboards, plastics, and corrugated boards all play an important part in the production of the display.

There are several categories of P.O.P. displays. Among them are display merchandisers, promotional displays, display shippers, counter displays, floor displays, and gravity-fed displays.

(Large supermarket displays, permanent displays, wire displays, dump bins, and motion displays, all of which tend to be larger and more expensive to produce, are not discussed here.)

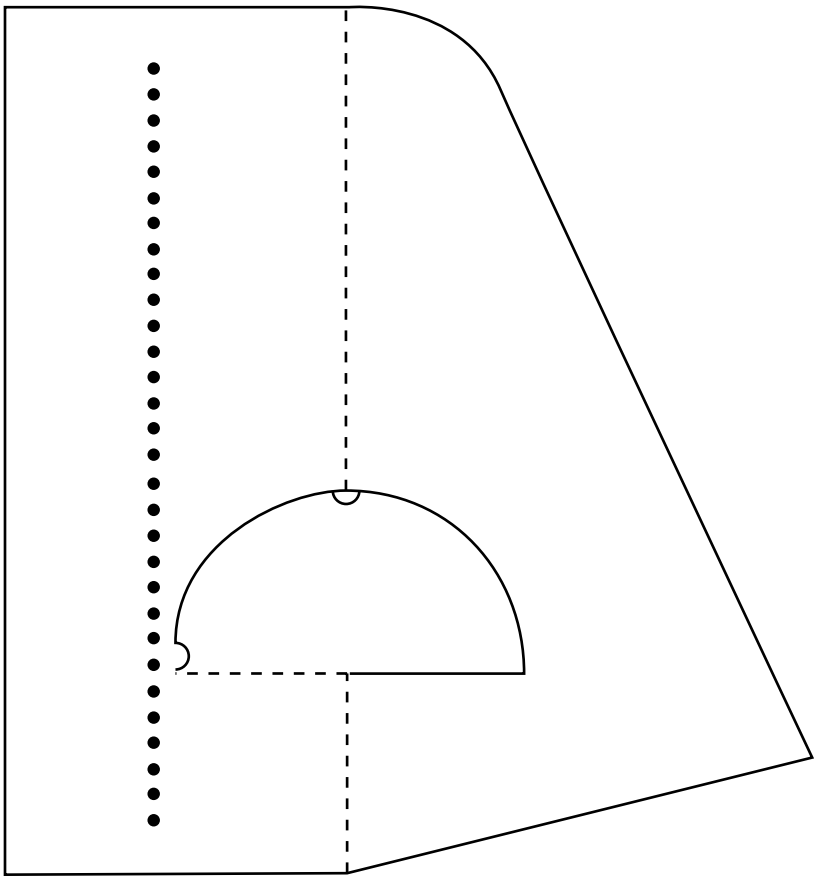
Display merchandisers play an important part in self-service systems because they are strategically placed in the store, usually near the cash register or checkout counter. The display merchandiser is sometimes called a promotional display because it is designed to be used only for the duration of a particular promotion.

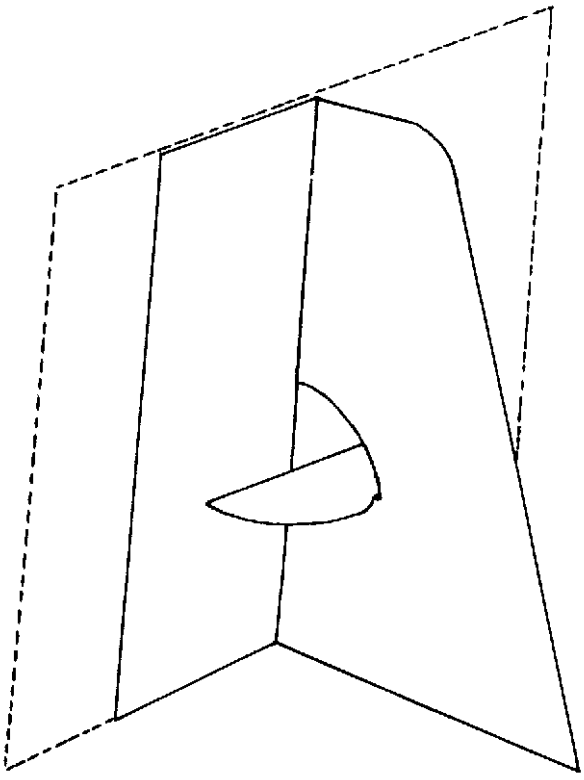
Promotional displays have a short life, usually three to four weeks (i.e., the duration of the promotion). The material used is usually paperboard or E-flute corrugated, often combined with an inexpensive vacuum-formed (thermoformed) plastic platform to hold the product.

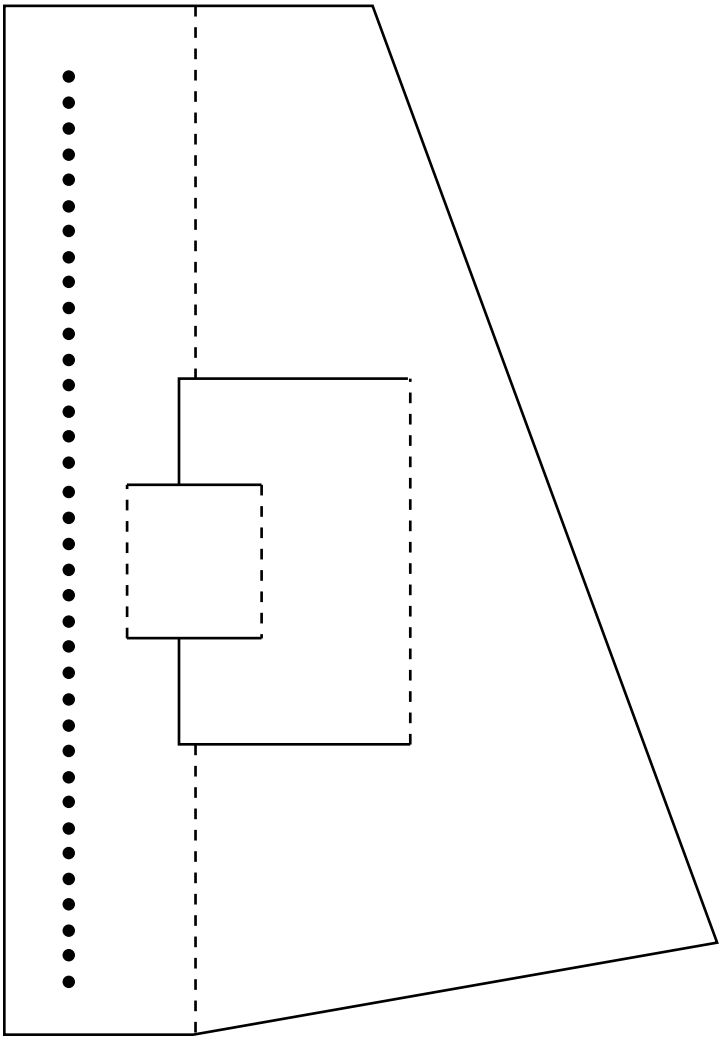
The *display shipper* is the most common variation of the promotional display. It is a shipping carton that opens up to form a display with a die-cut *riser* (or reader) panel for art and copy. Shippers are used in the mass merchandising of health and beauty aids, liquor, toys, novelties, pharmaceuticals, and books. The advantage of the shipper is that it combines a shipping carton with a display setup.

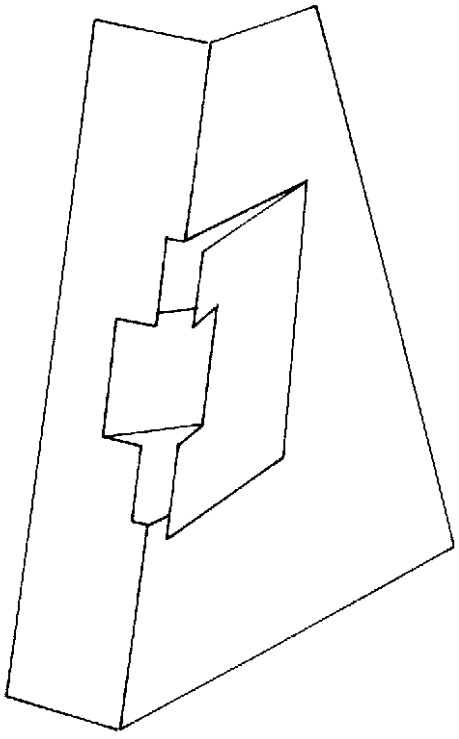
Gravity-fed displays are one of the oldest types of display systems. They are used for film, shoe polish, and small packages of various products.

The following pages contain a variety of structural designs and patterns for P.O.P. displays.

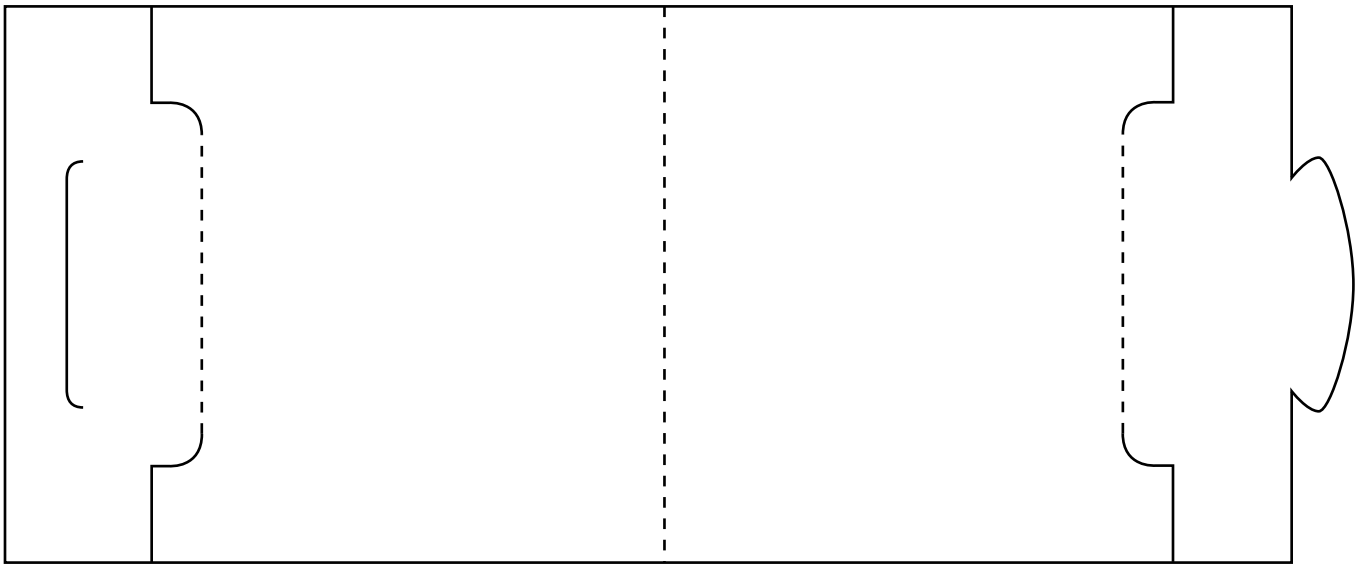


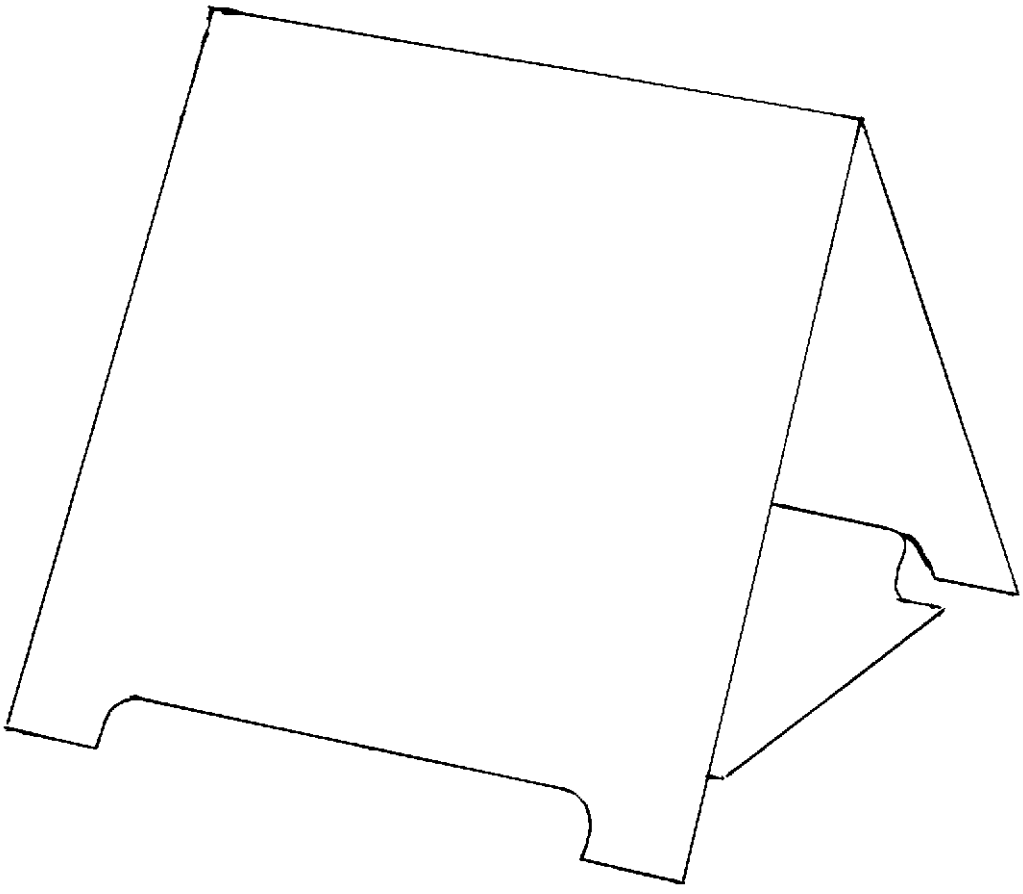


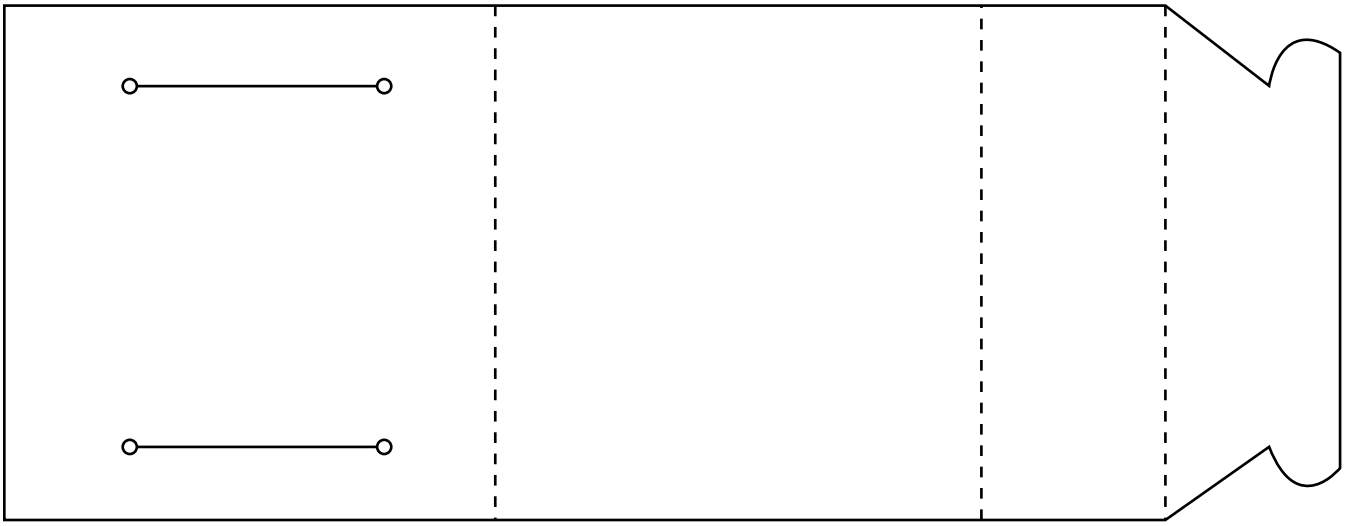




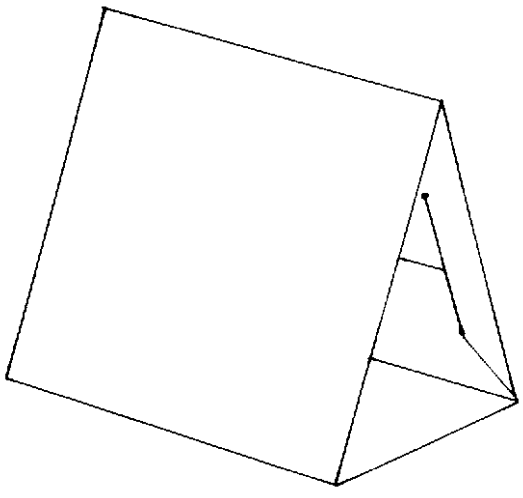
This S.W.E. (single-wing easel) invented by Mike Scotti stays erect by spring tension.

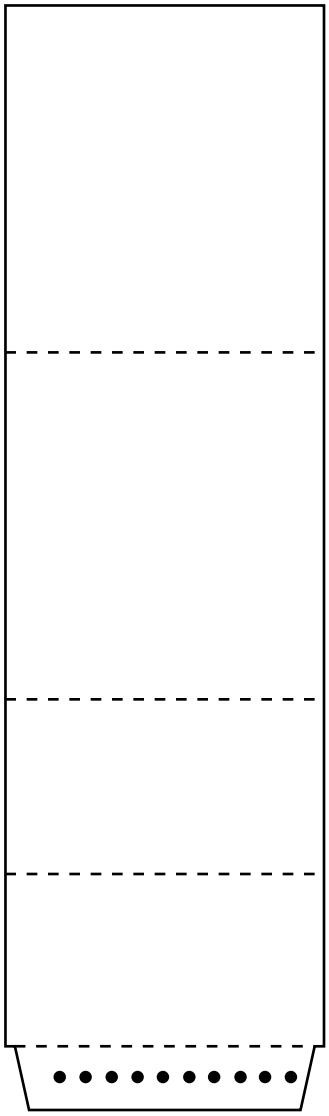


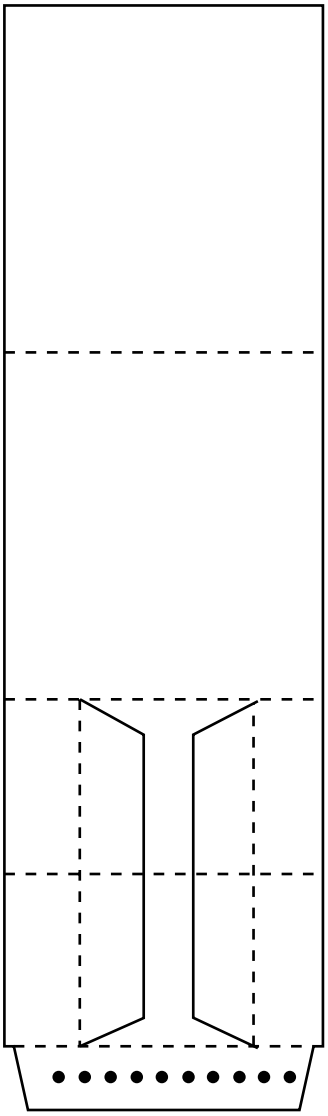




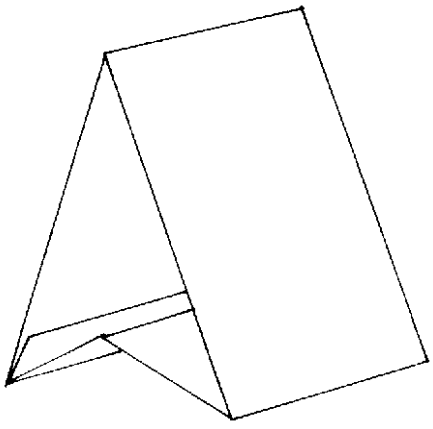
The ears slide in the slots when the easel is set up.

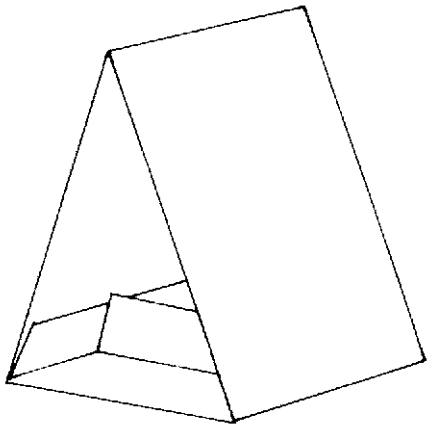


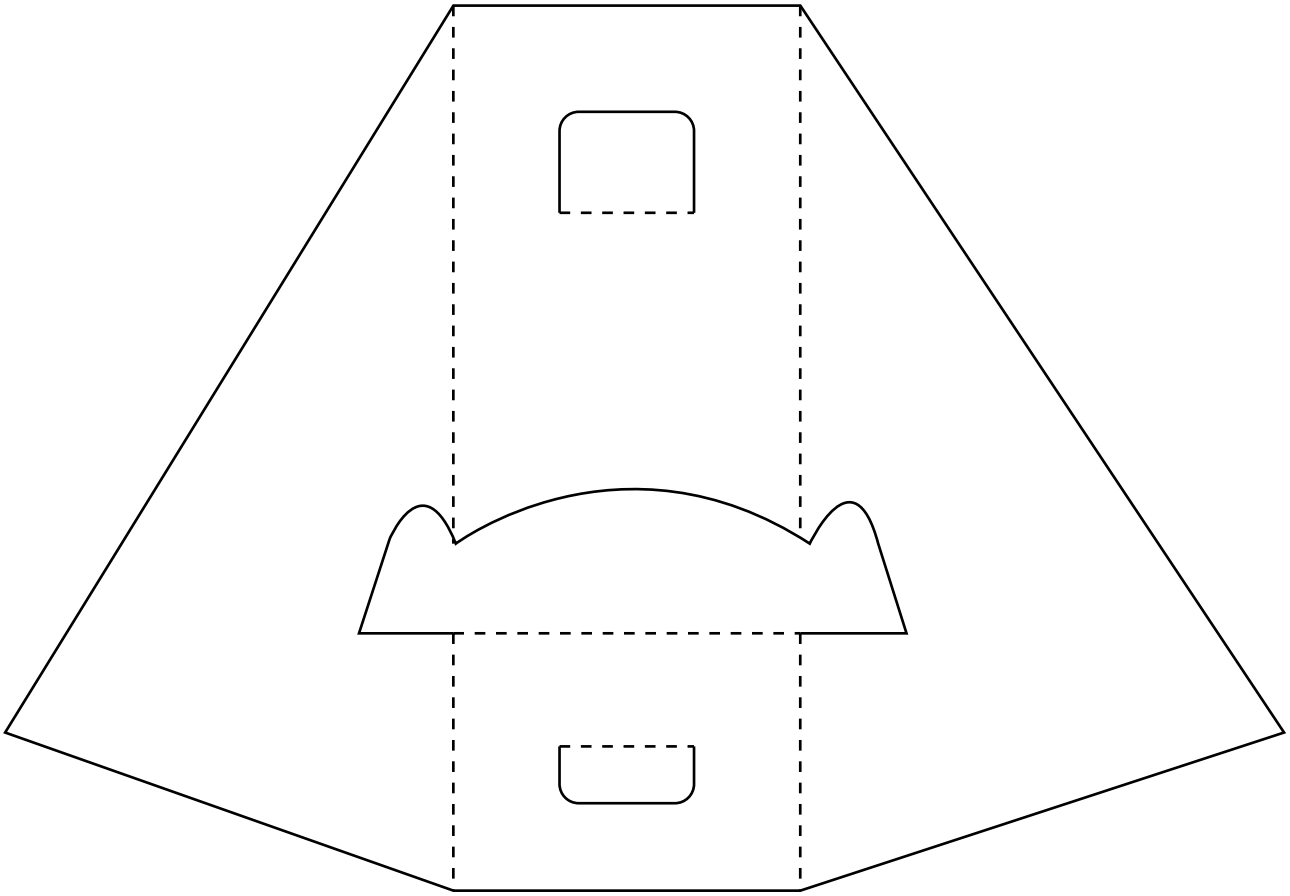




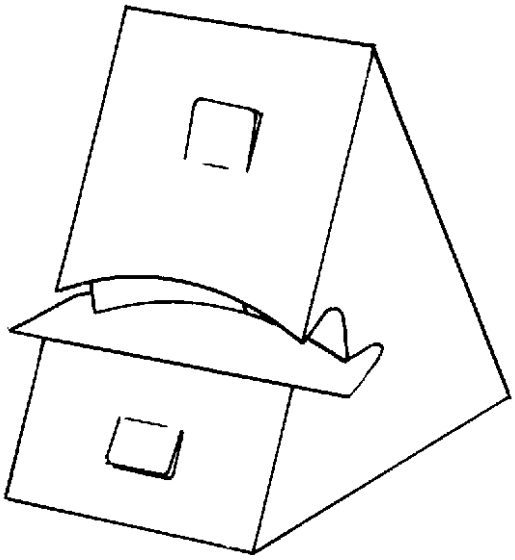
May be locked by pop-ins on the bottom panel.

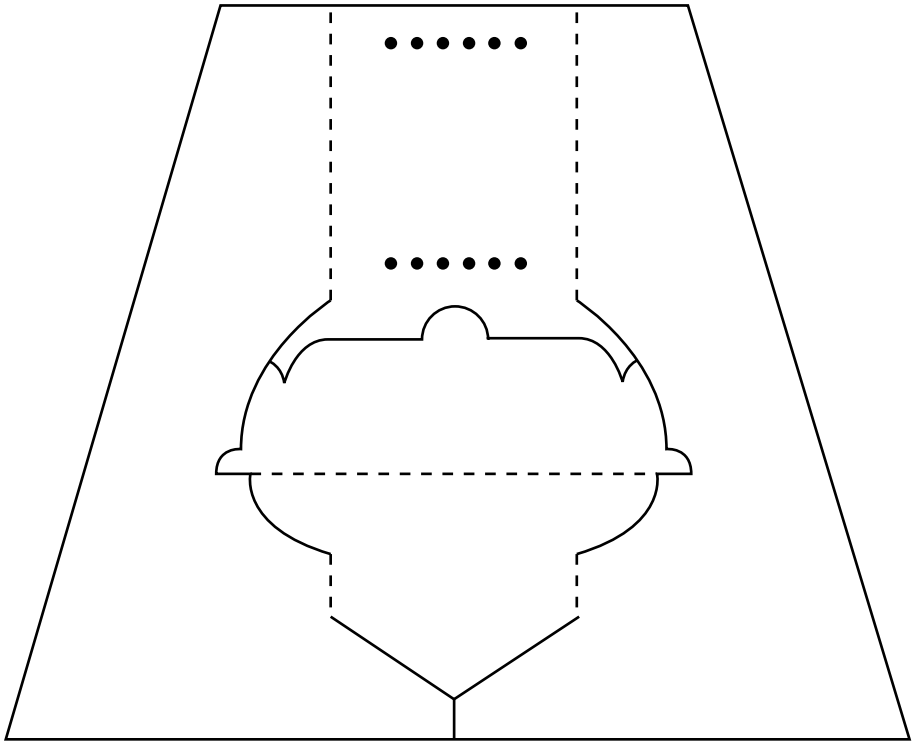


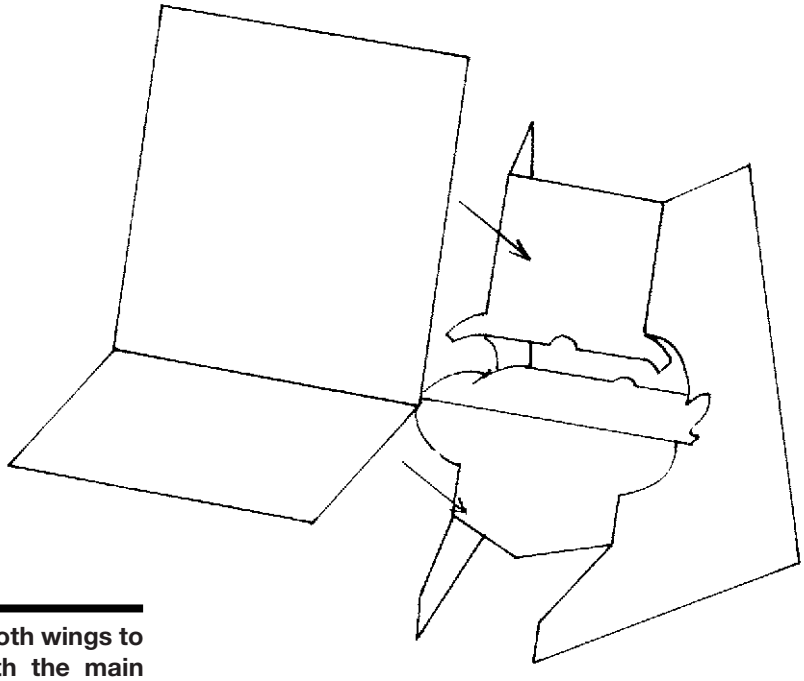




May be glued to back of cards, boxes, etc., or may be keyed with lock tabs to display.

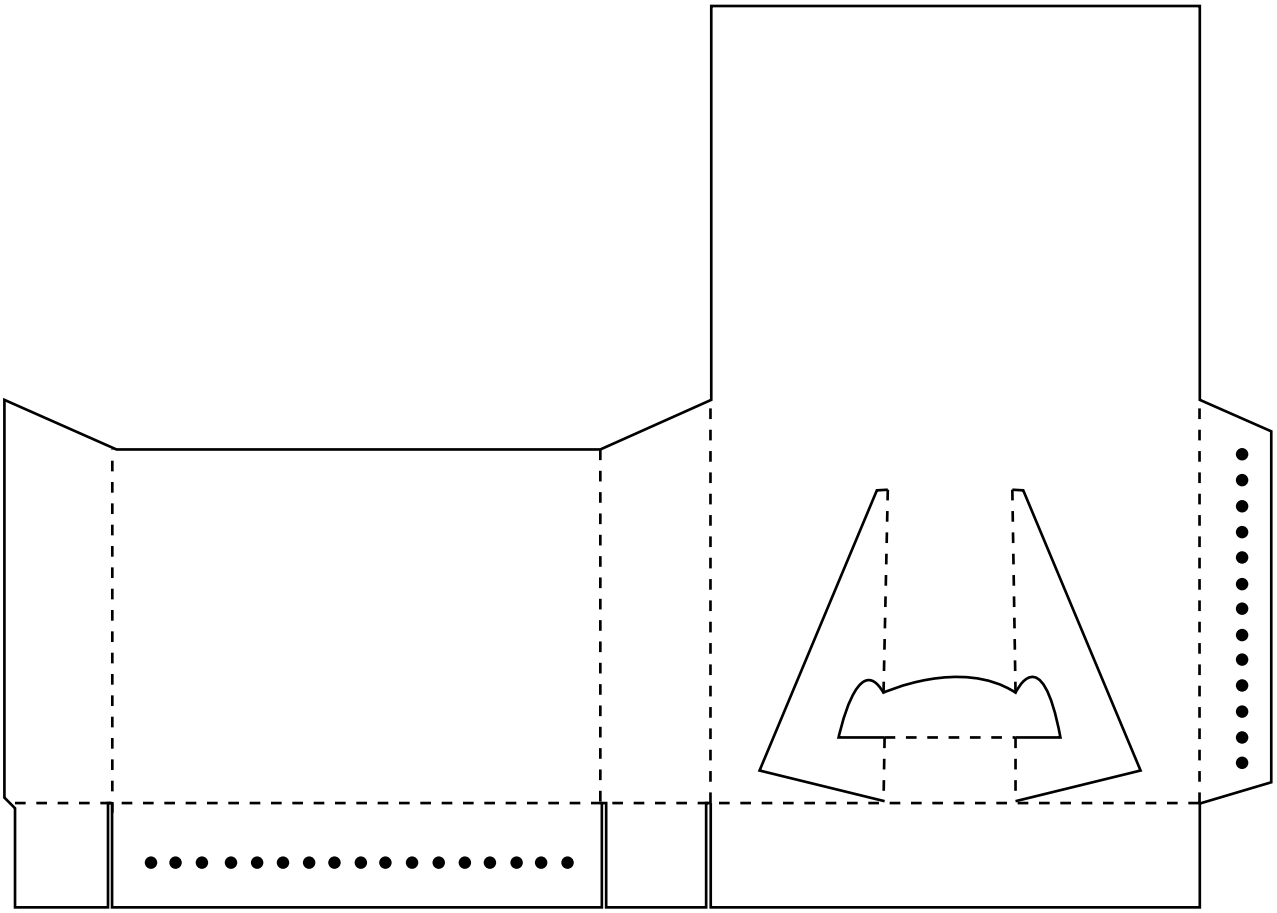


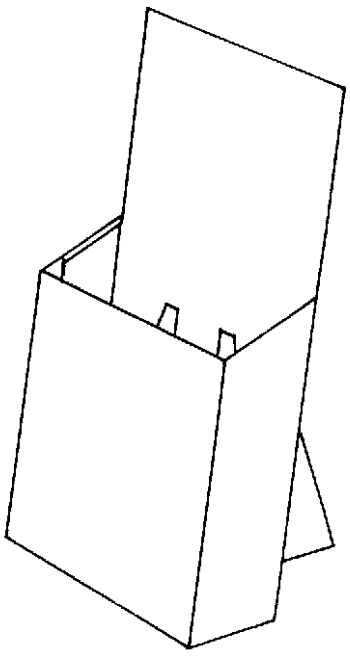




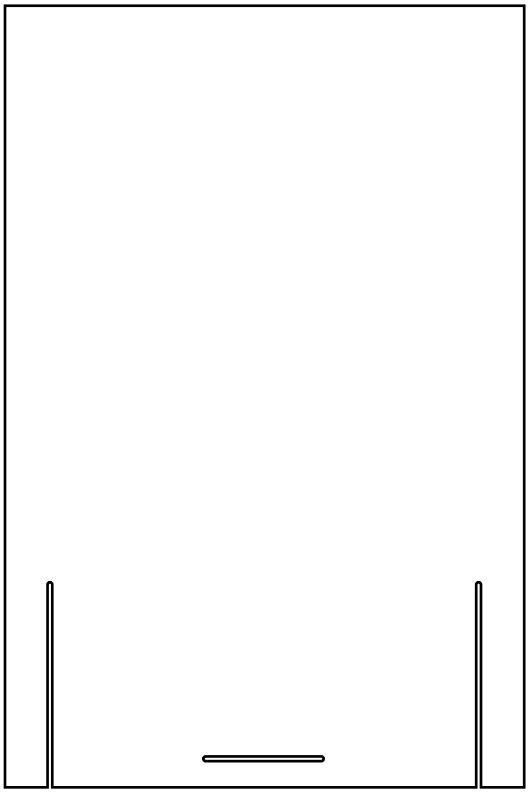
This easel has forward projections off both wings to support a "cowcatcher" panel beneath the main panel of the display.

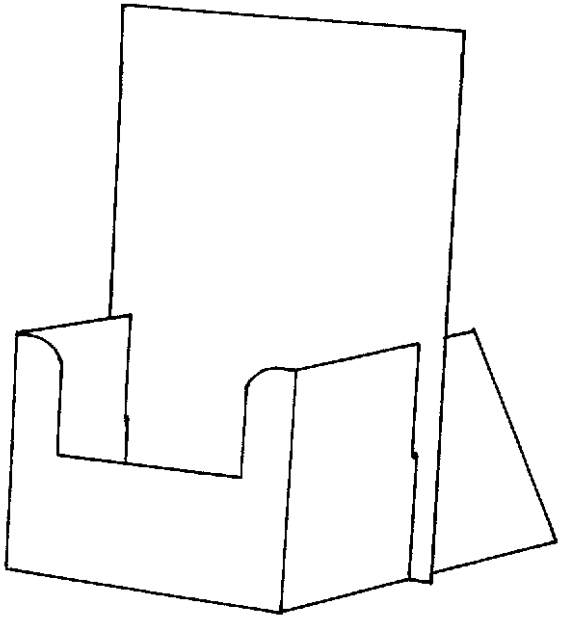
DISPLAY CARD, BROCHURE, OR SAMPLE HOLDER WITH TWO-WINGED EASEL BUILT IN

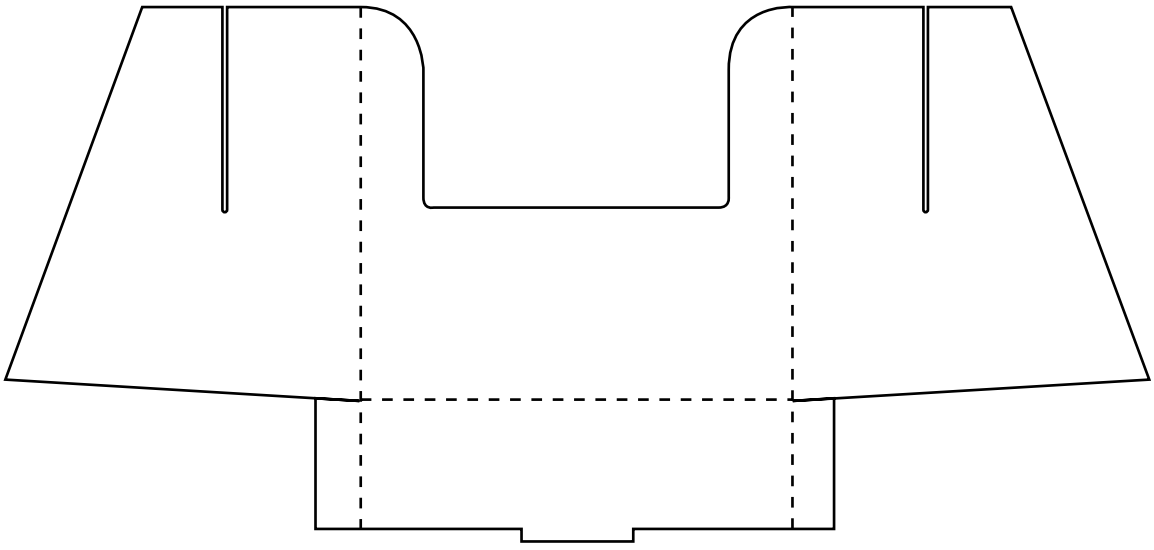


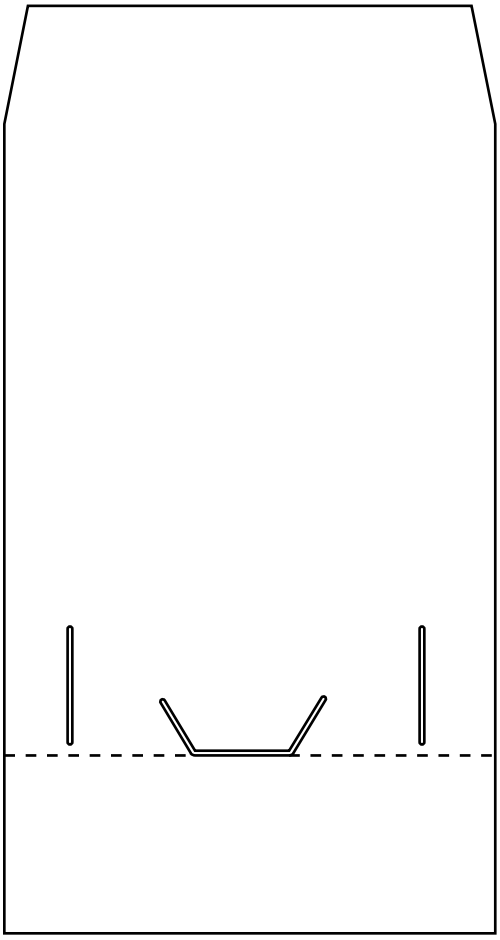


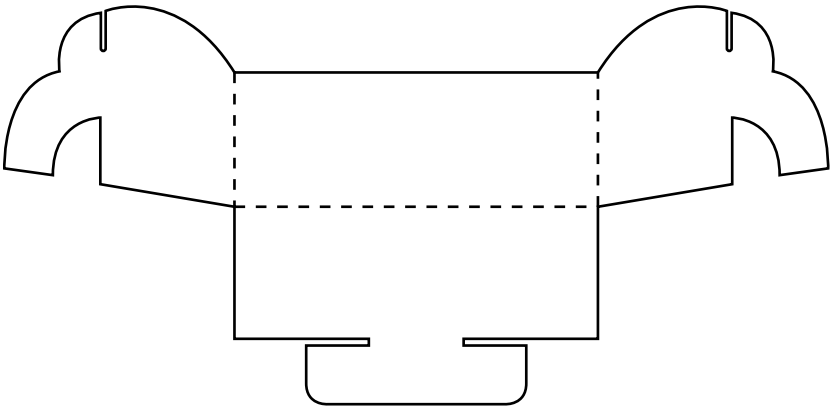
TWO-PIECE DISPLAY EASEL WITH HEADER CARD AND
SAMPLE/BROCHURE BIN

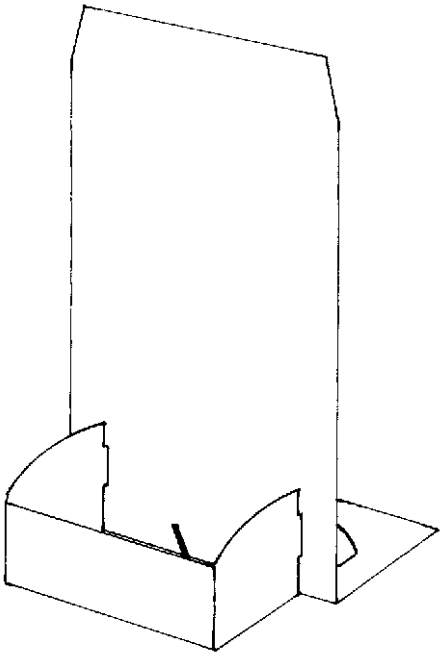


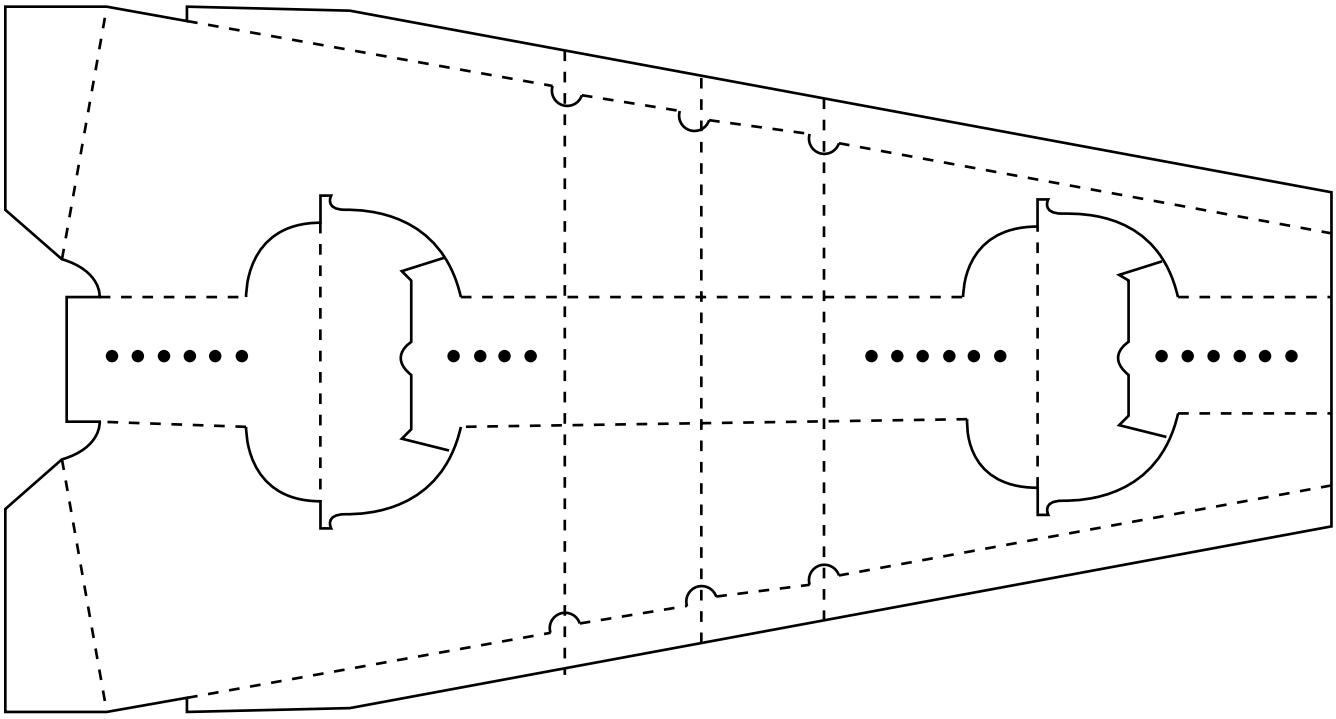


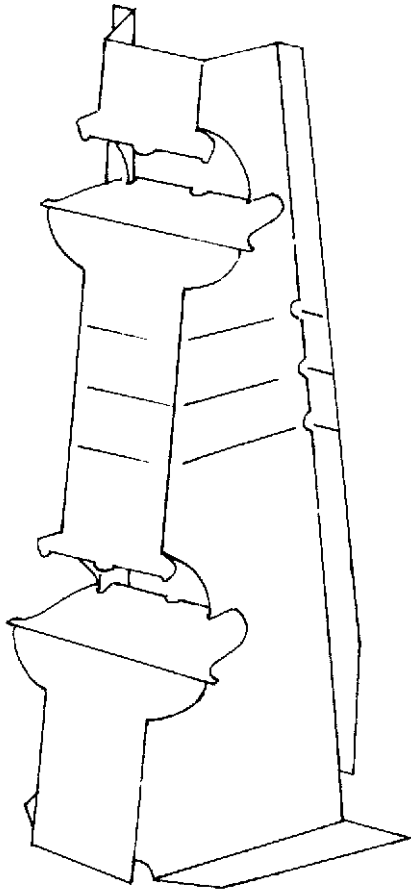






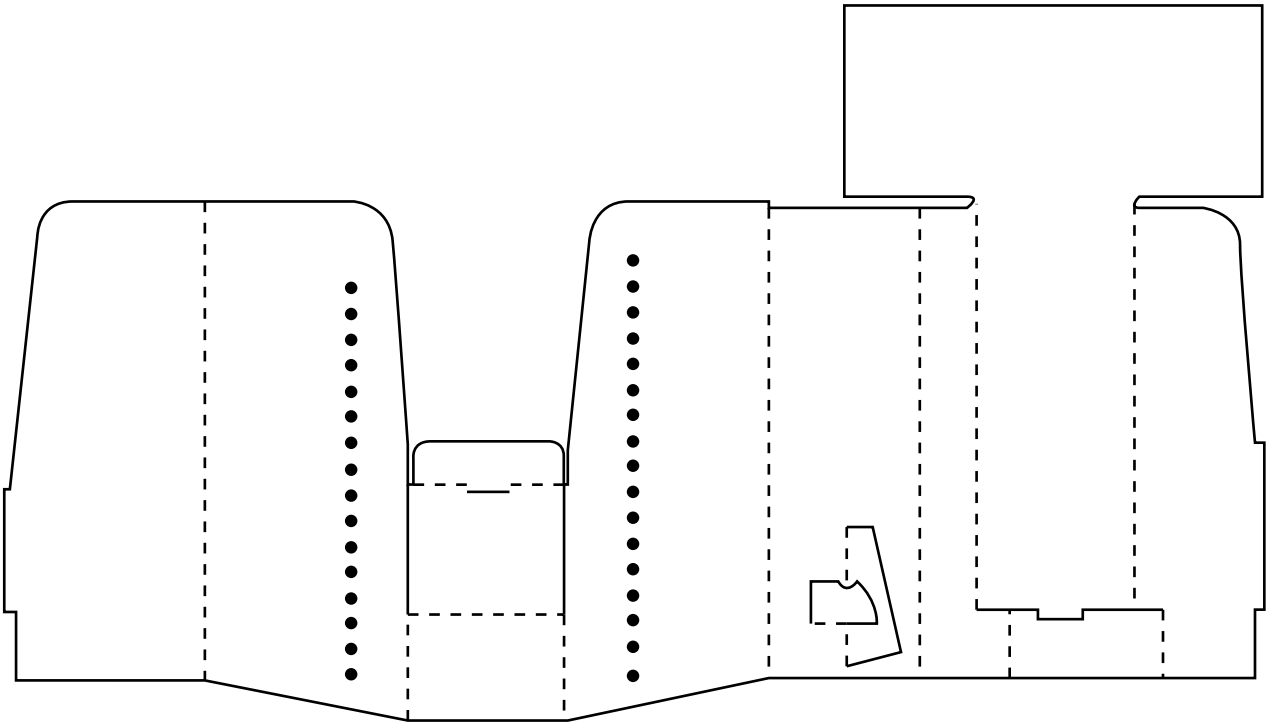


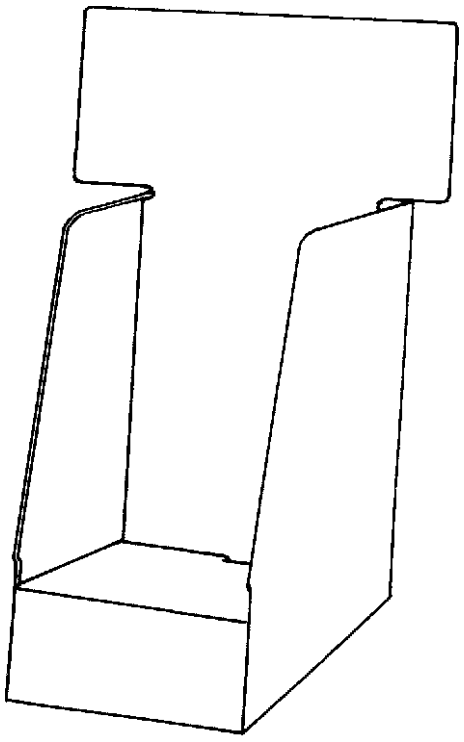




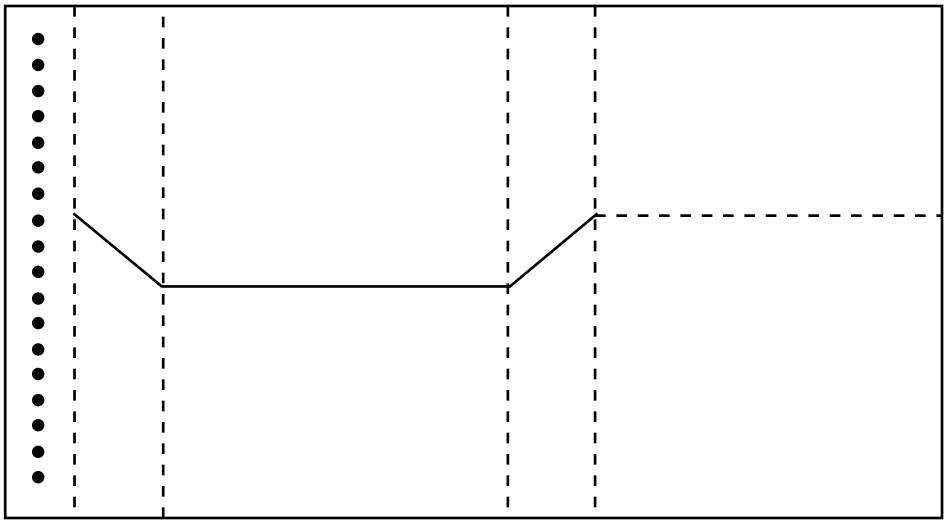
This easel is especially suitable for very tall displays that need to be folded in half for shipping. The middle portion of the easel may be accordion-folded back out of the way of the main lateral crease of the display.

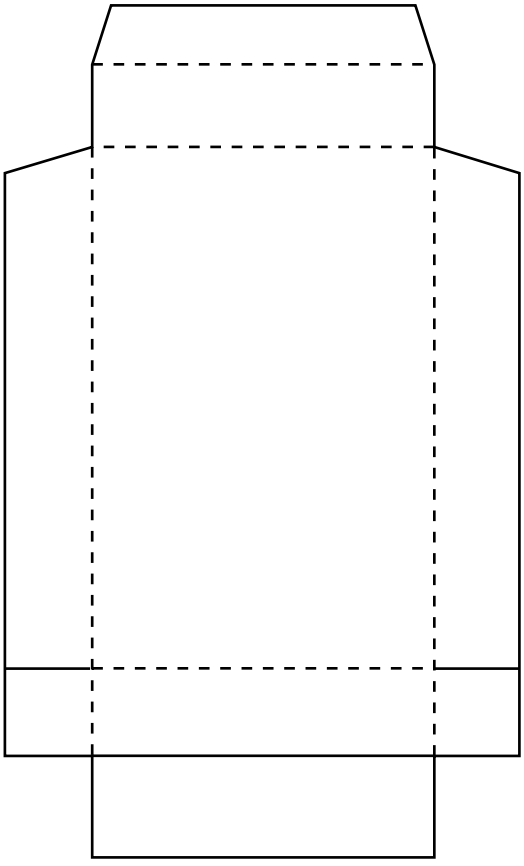
The reinforcing turnbacks lend extra stability.

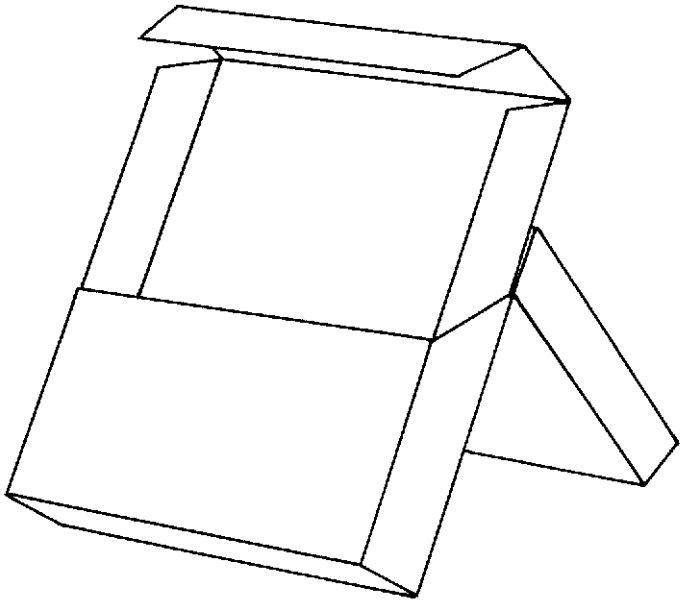


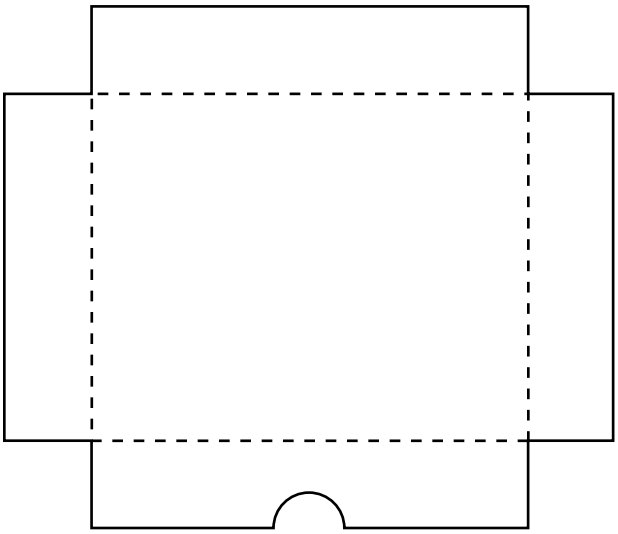


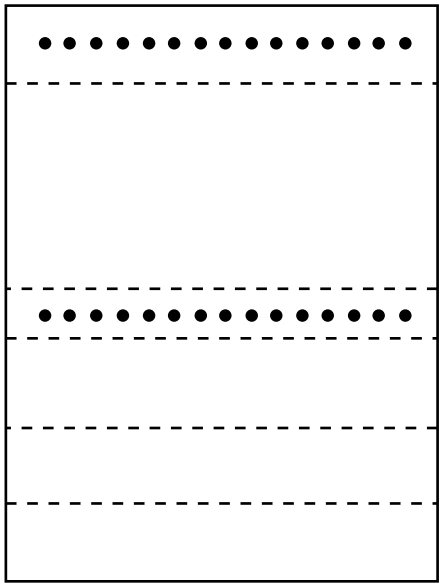
PULL-OUT SLEEVE THAT, WHEN FOLDED BACK, CREATES A SELF-SUPPORTING DISPLAY

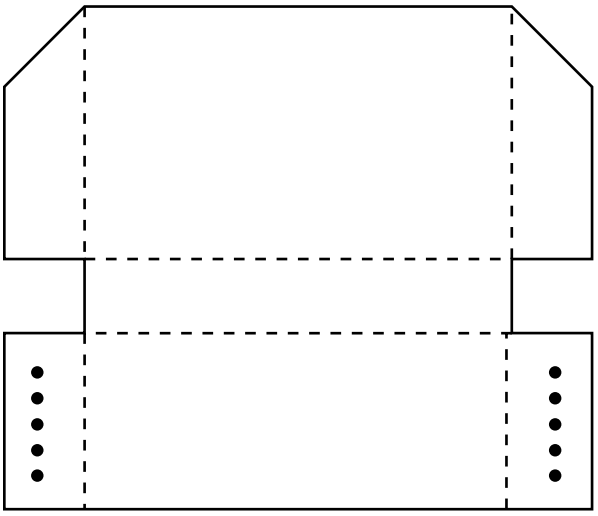




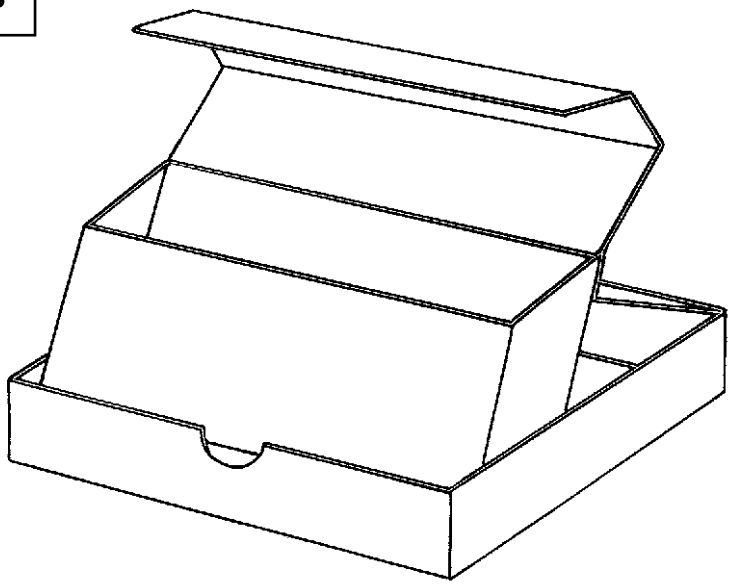


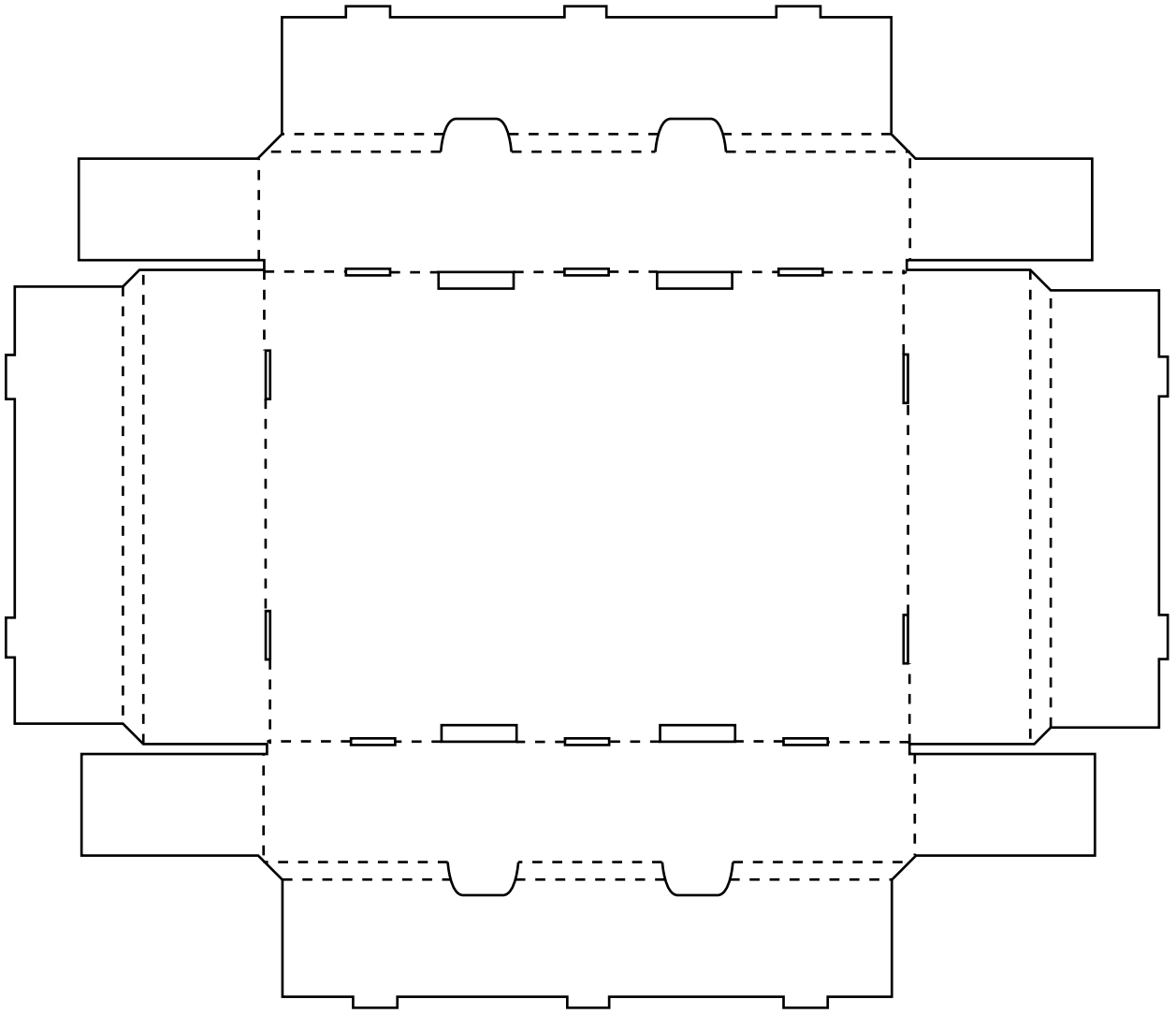




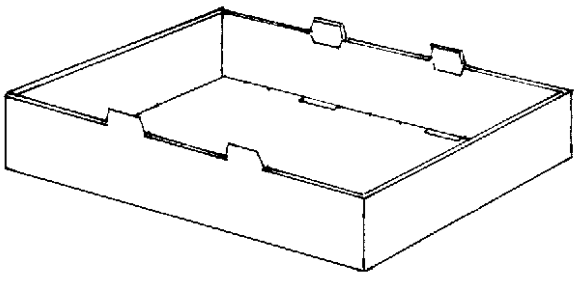


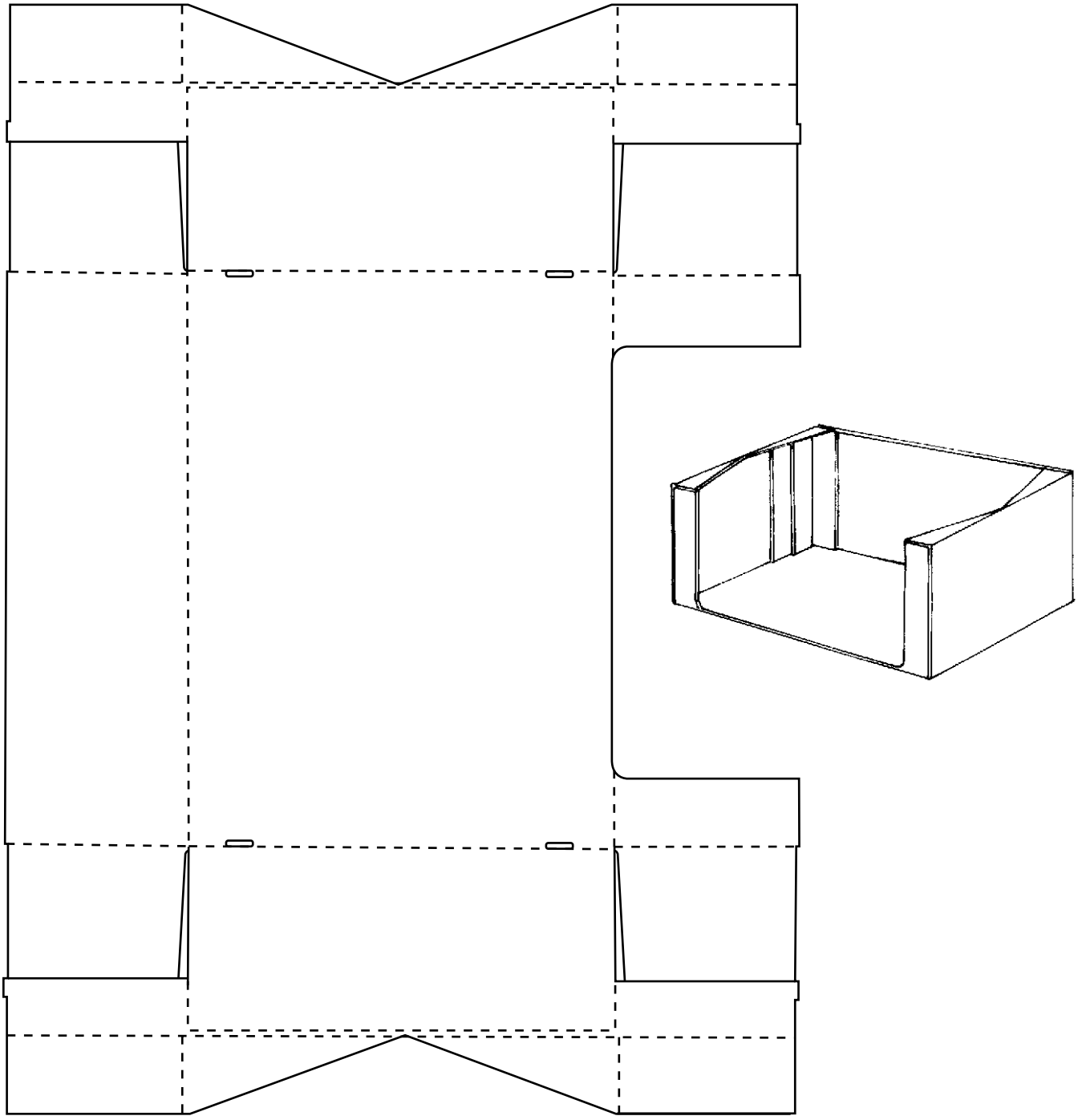
This is a rigid (set-up) box; the corners of the outer tray are connected with stay tape and the tray is covered with cover stock.



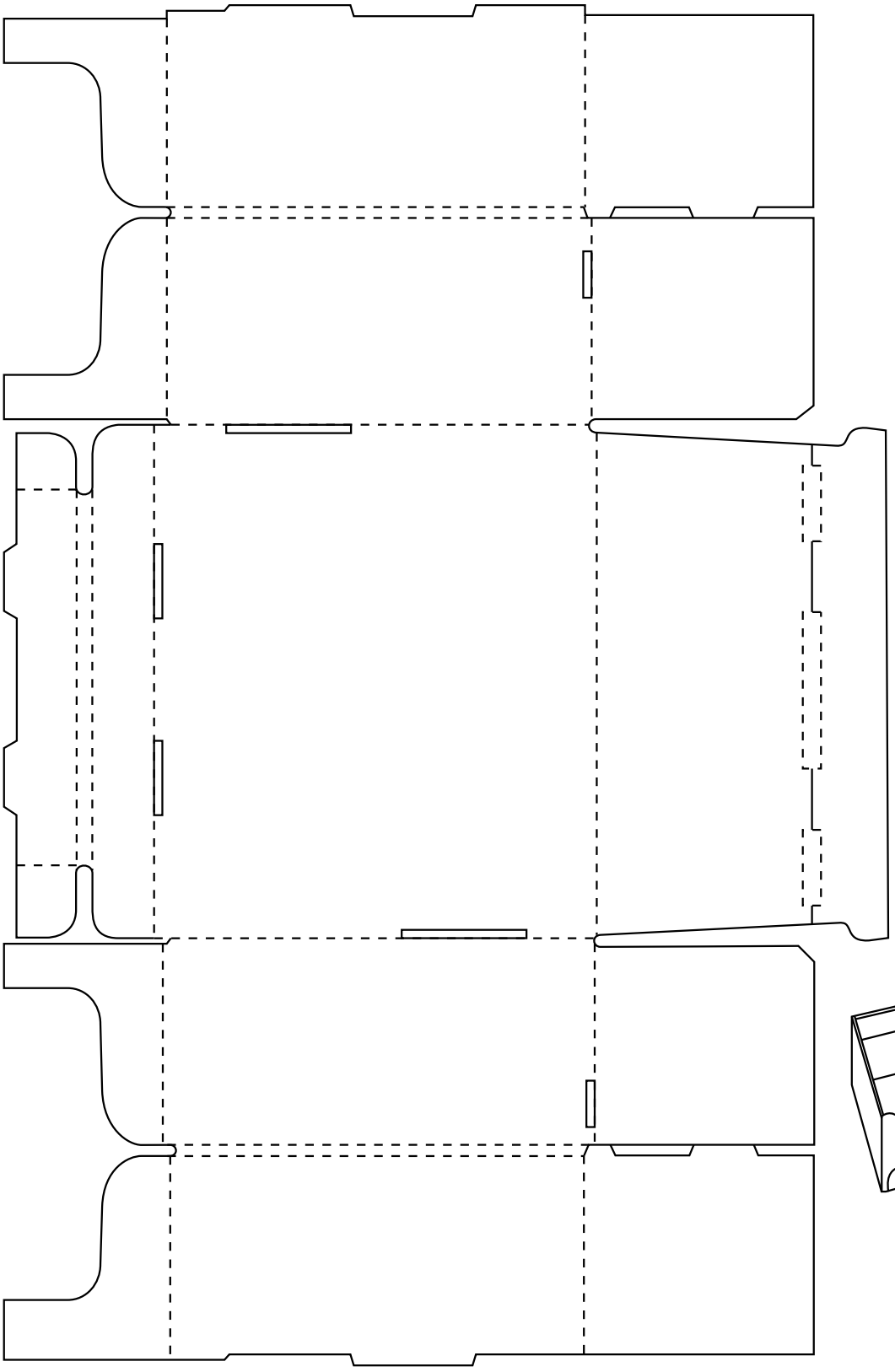


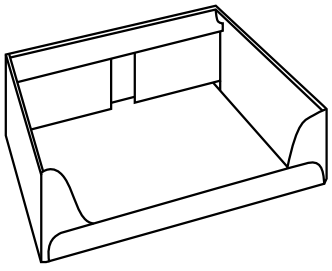
The stacking tabs that protrude above the top surface of the container insert into the slot of the above-stacked container with a compatible footprint.

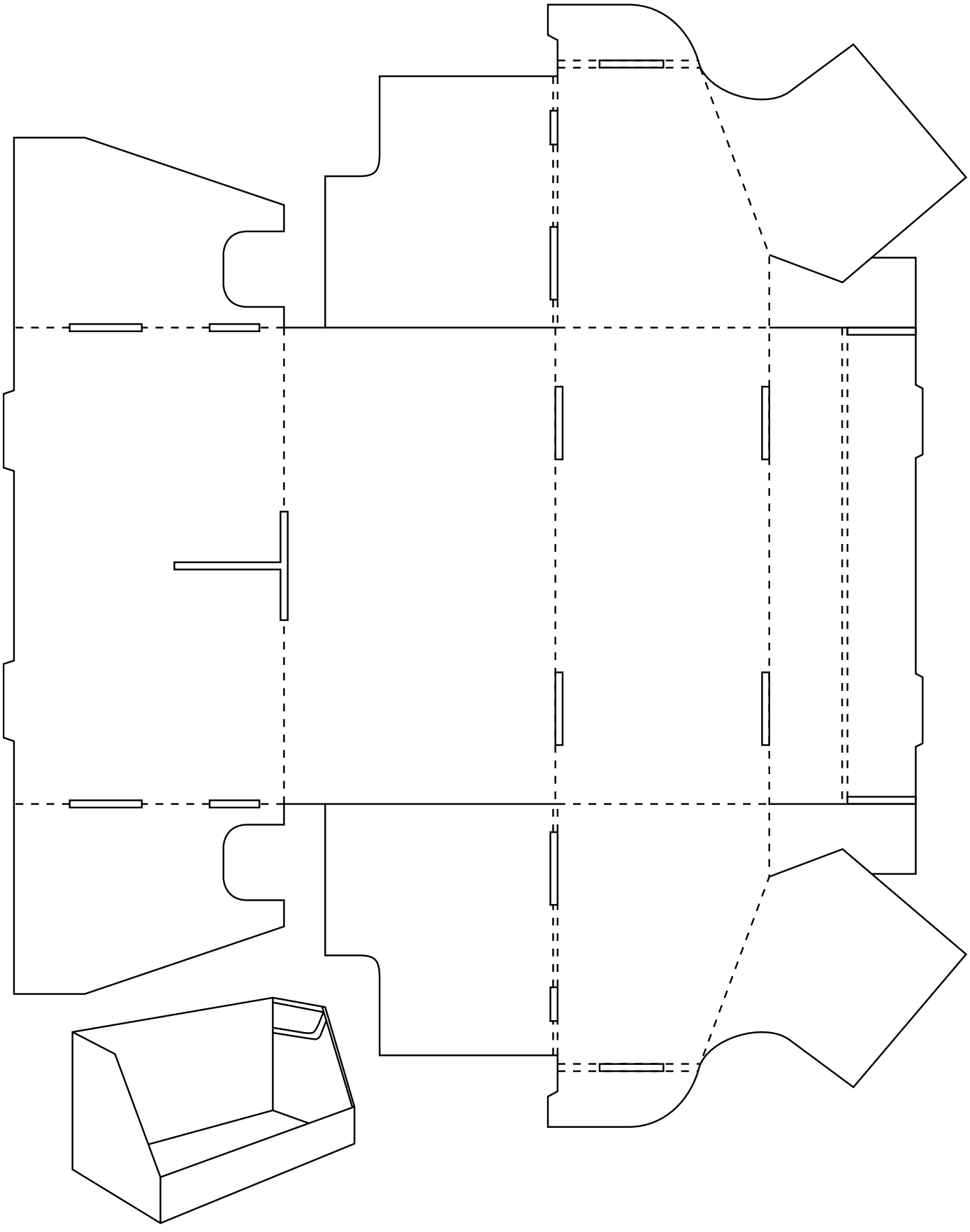


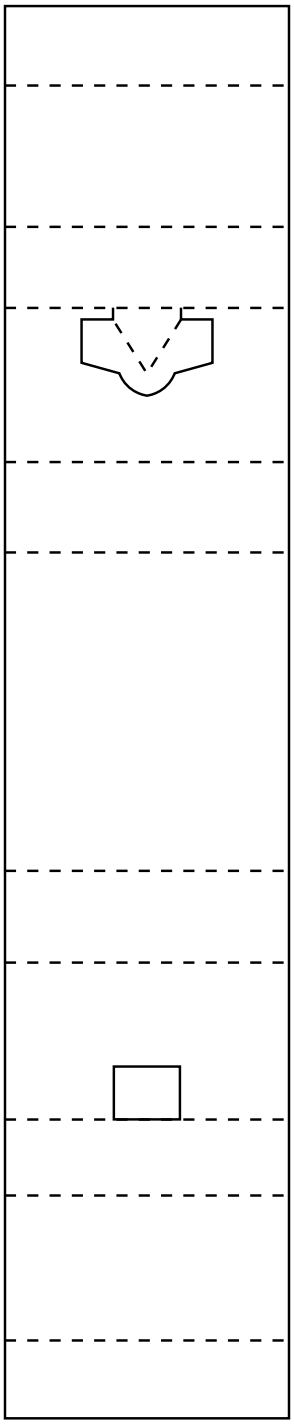


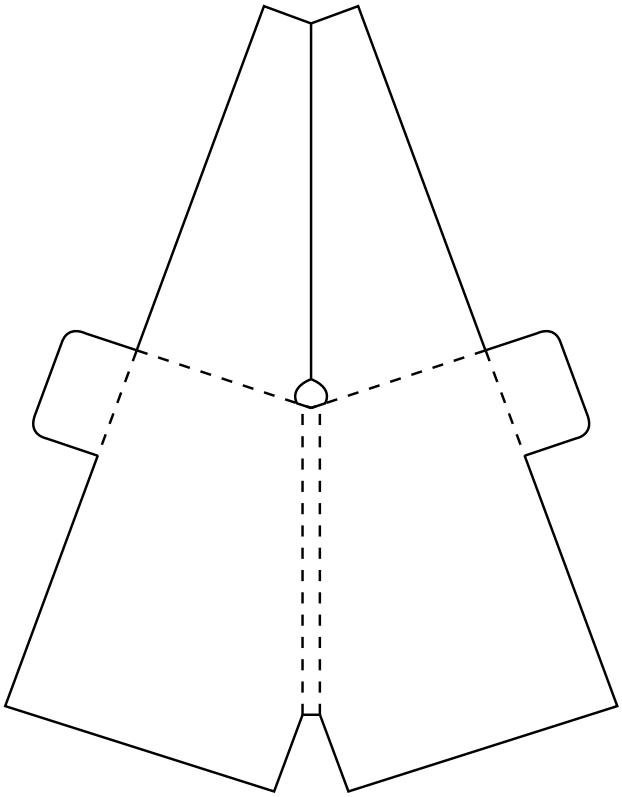
Shown with top and partial front removed, this unit has reinforced corners.

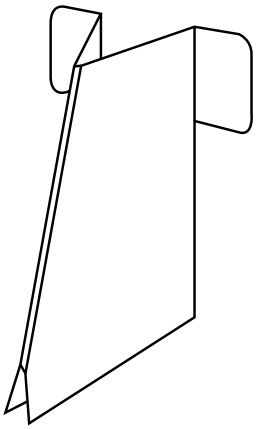


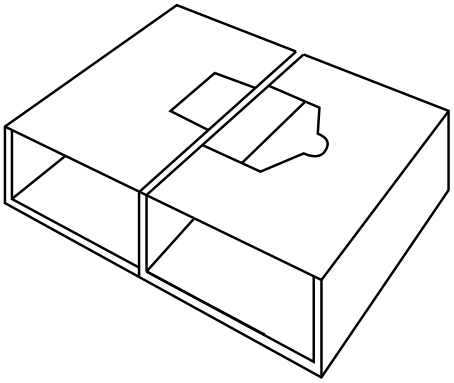


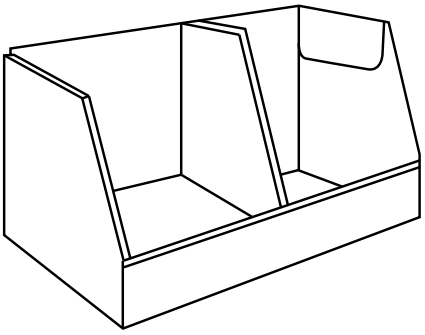


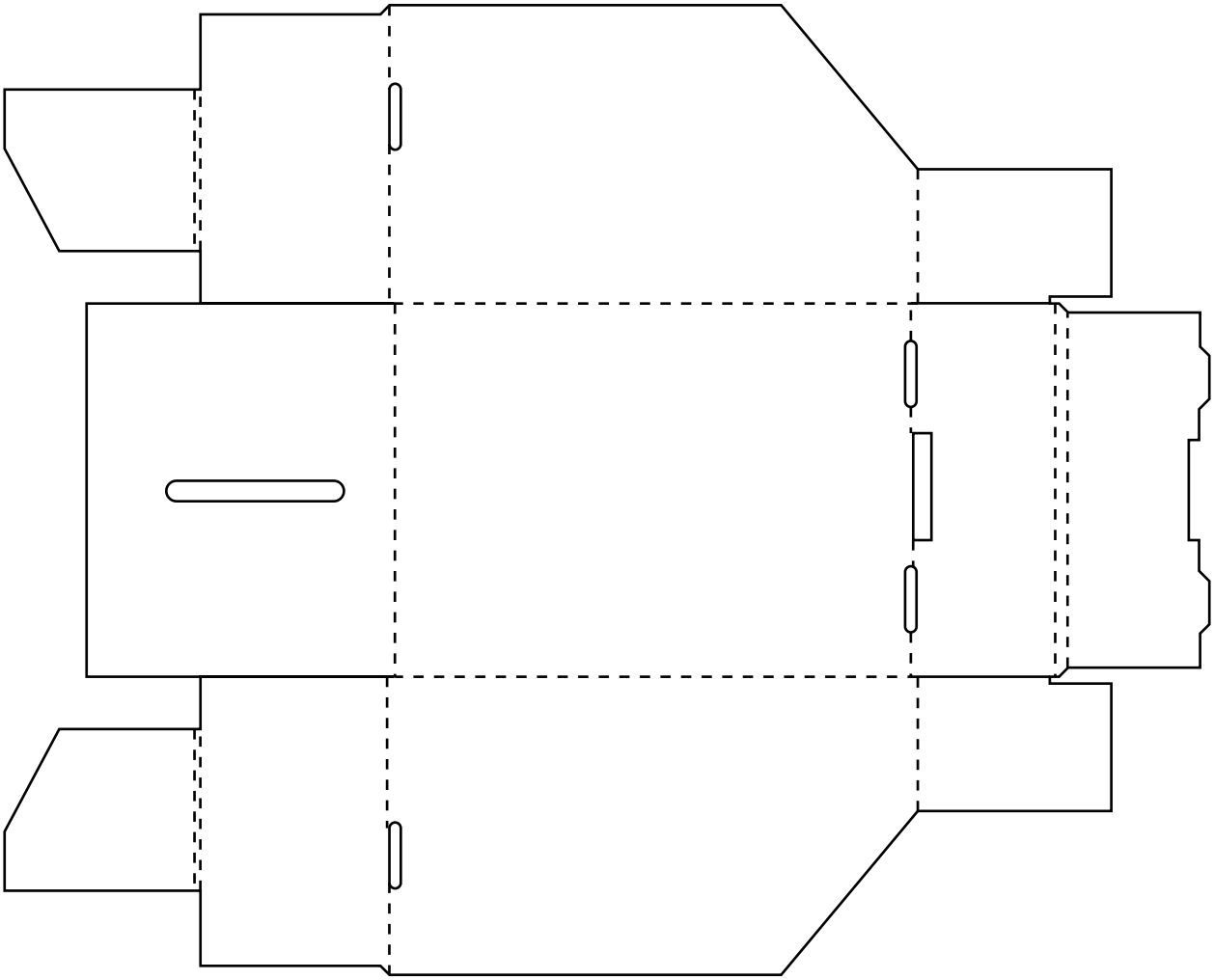




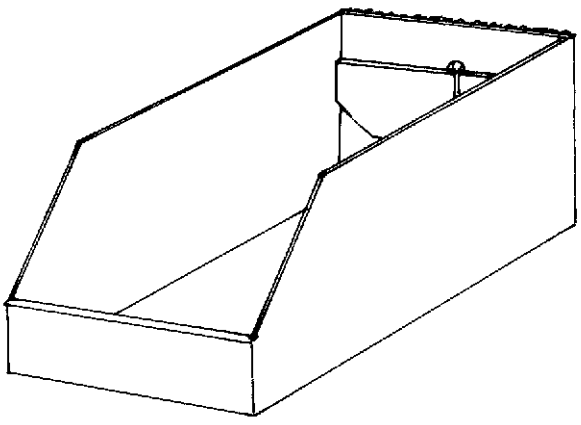


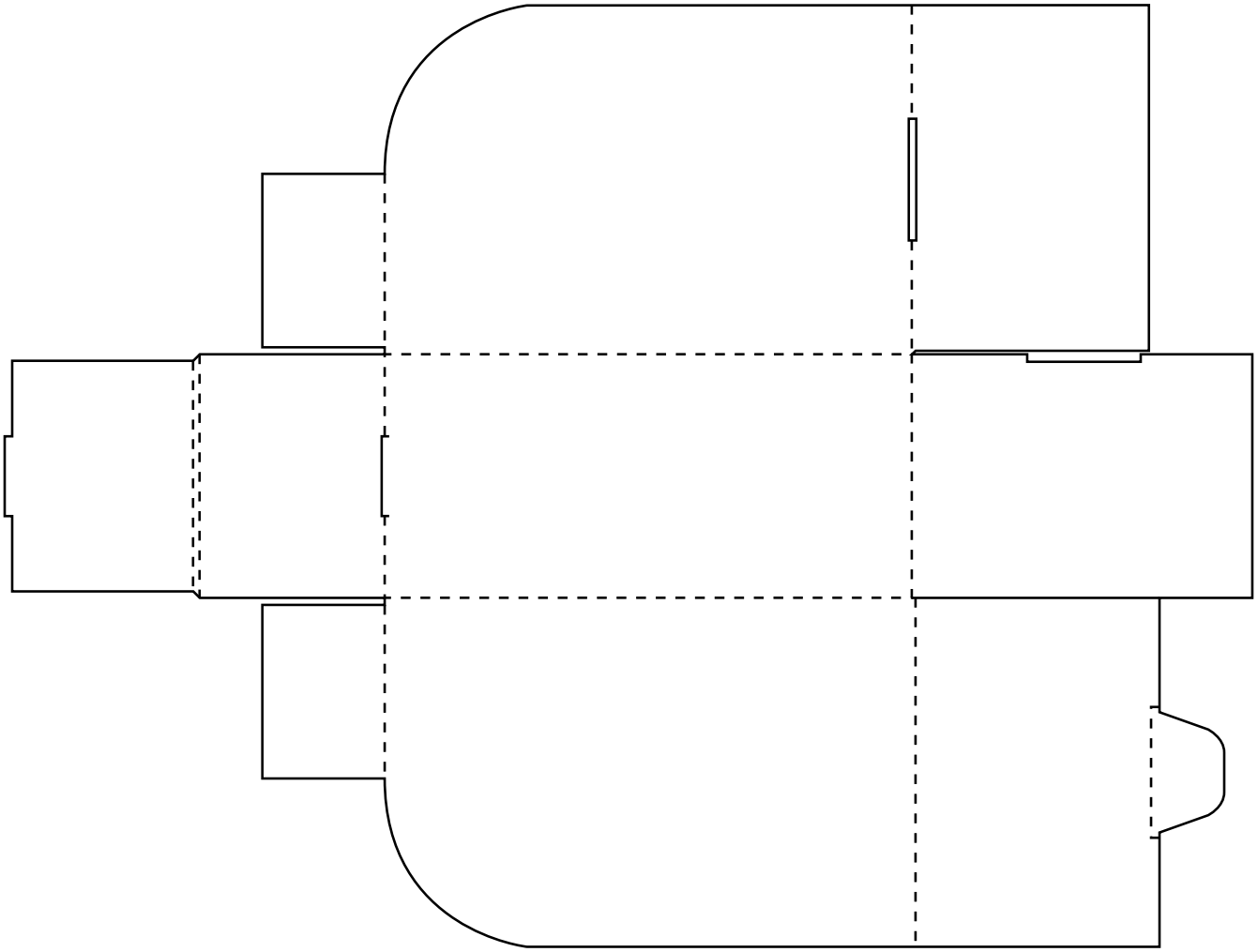




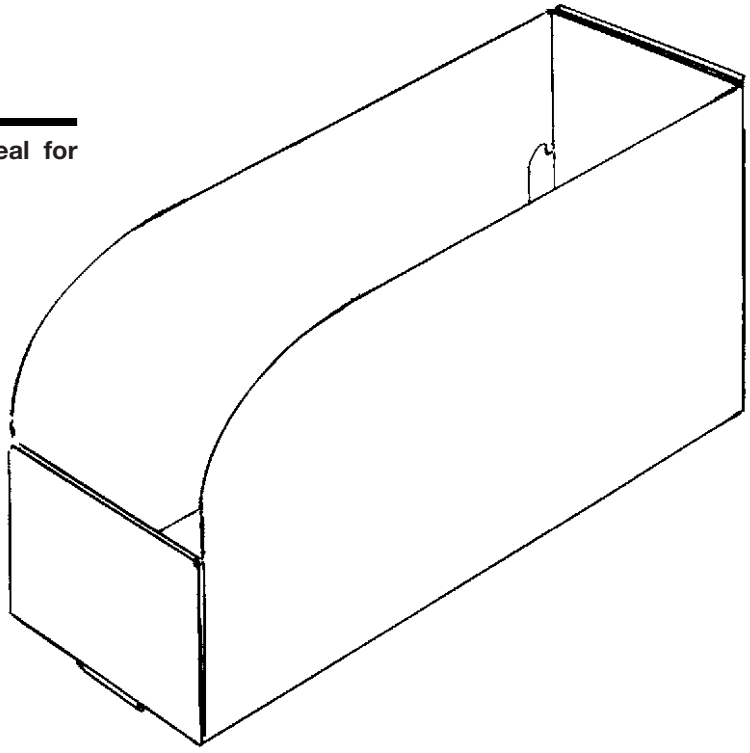


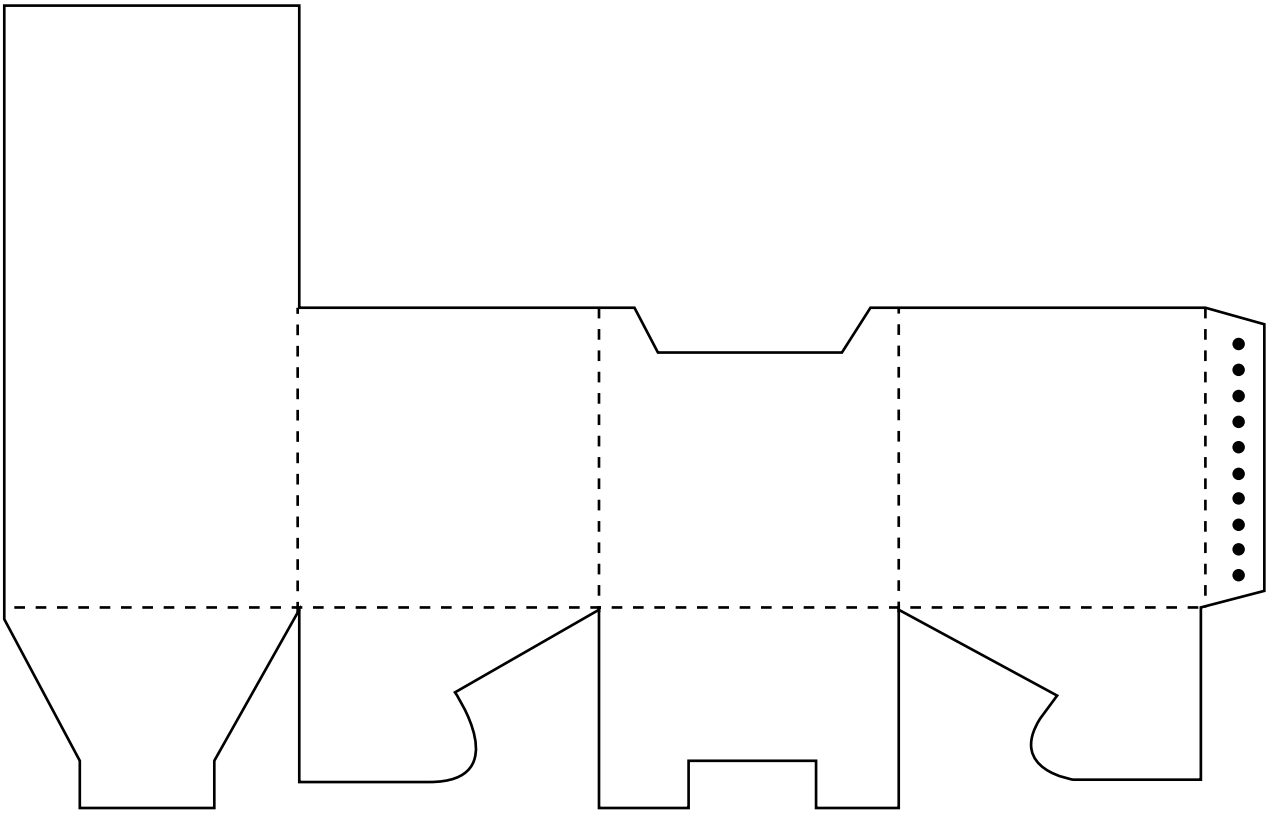
As a shipping container, this carton features a lid attached to the back panel (not shown). Once the lid has been torn off, the unit acts as a display bin.

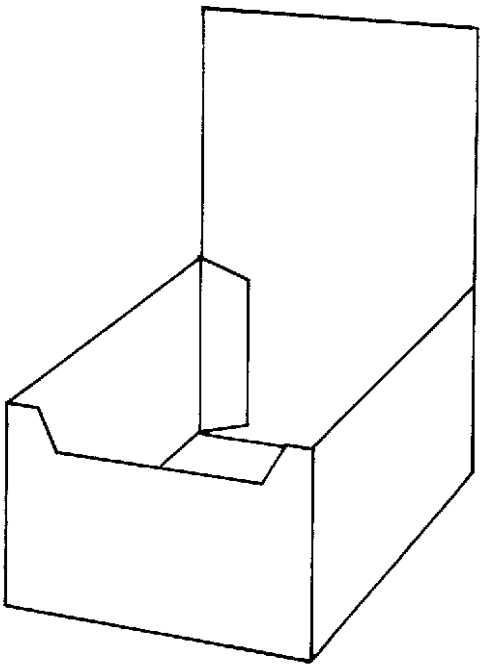


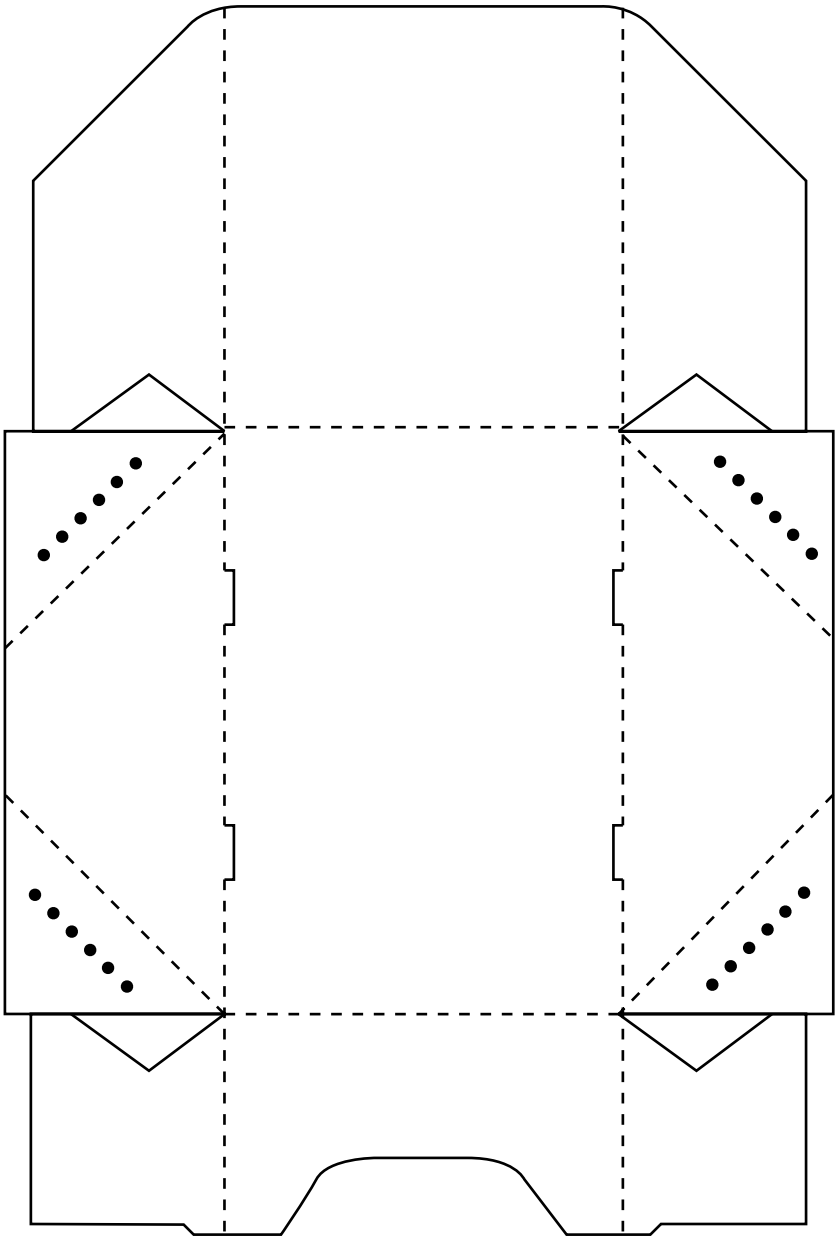


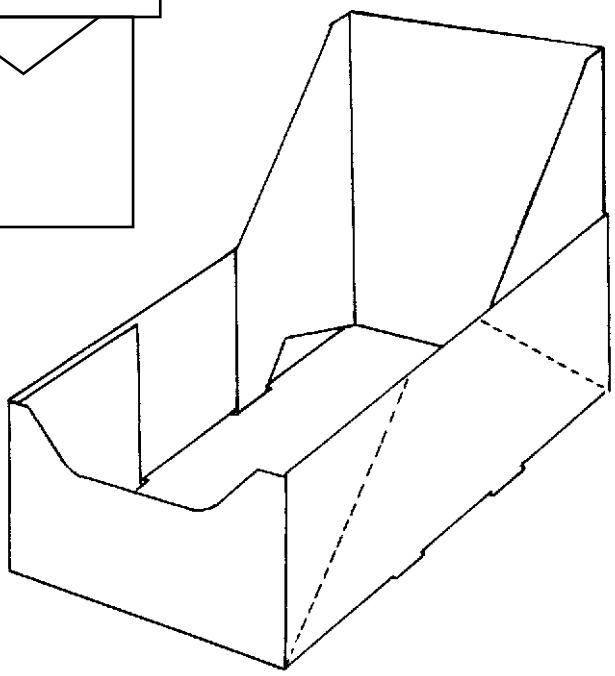
This double-front/triple-end wall bin is ideal for assorted hardware items.

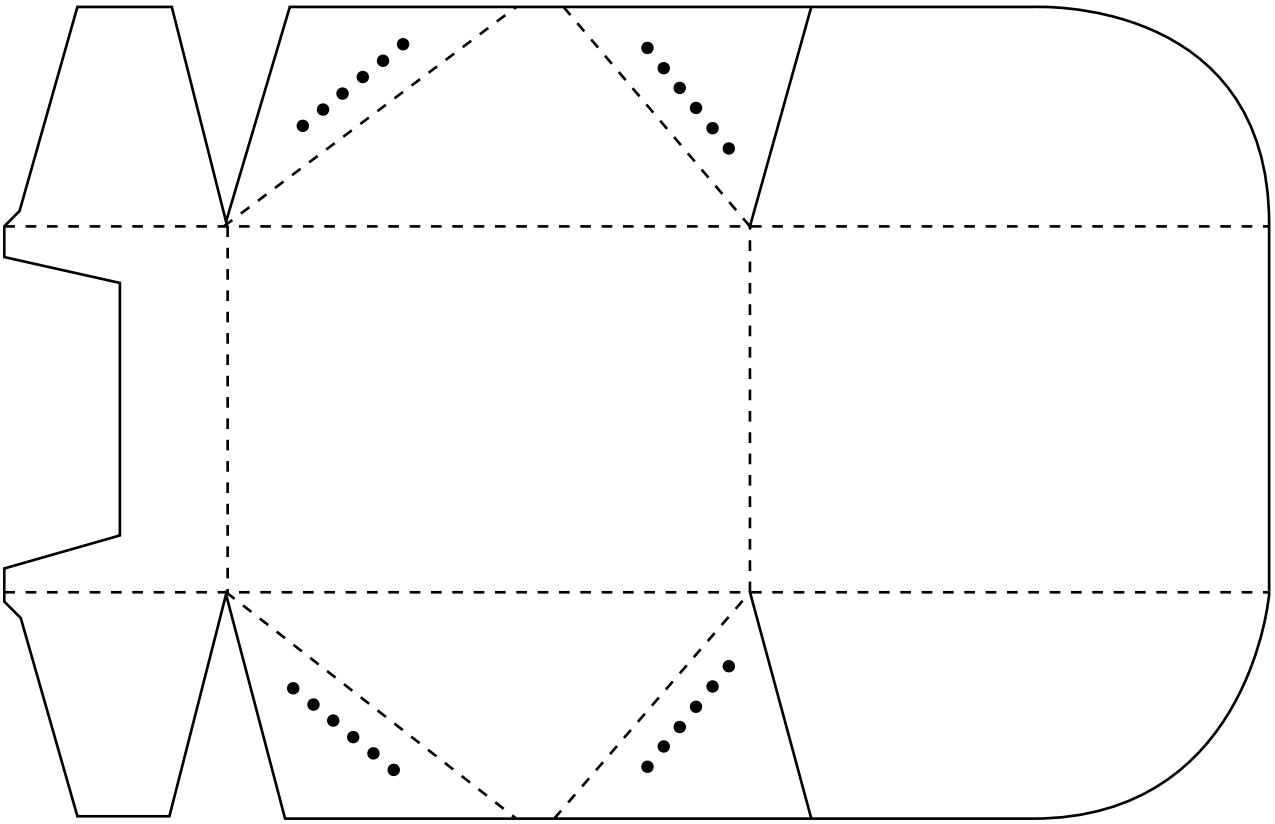


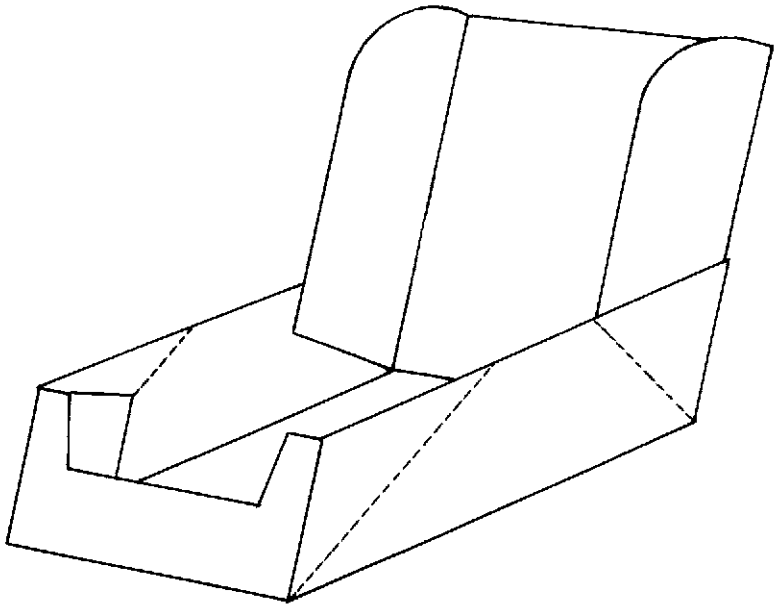


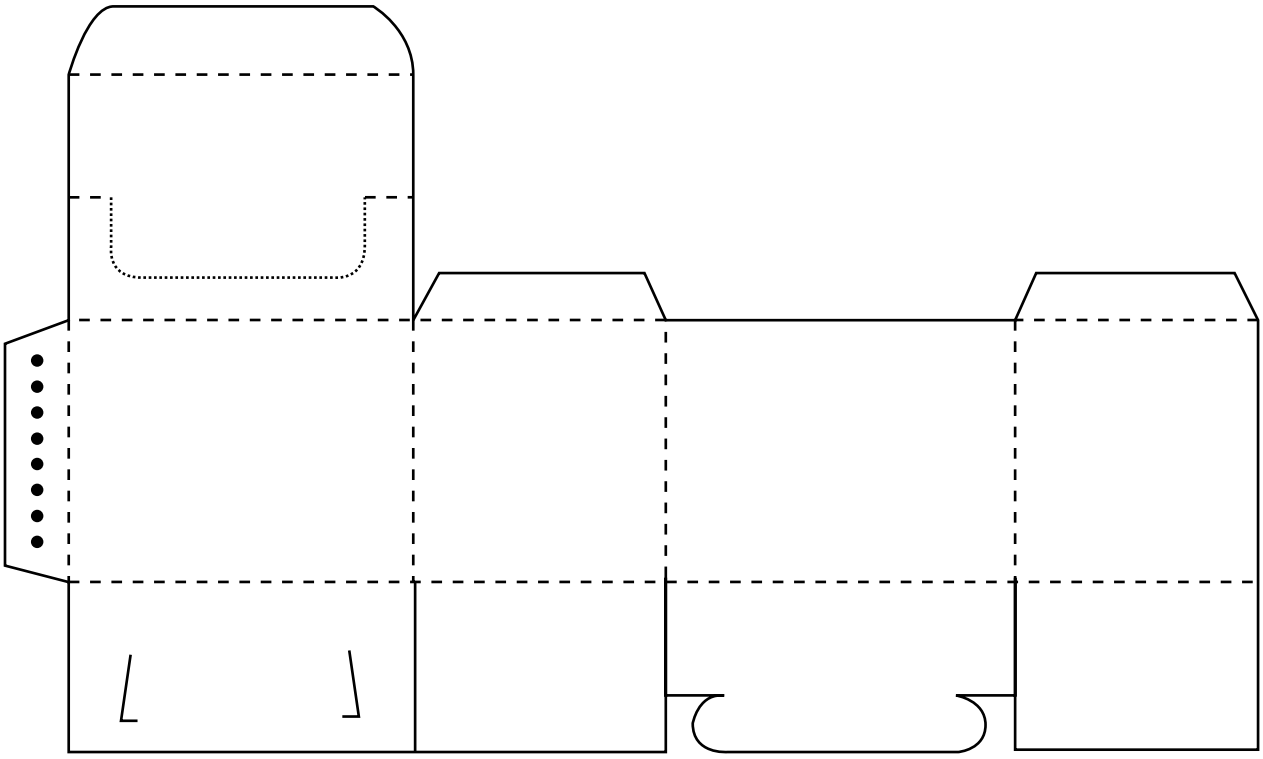




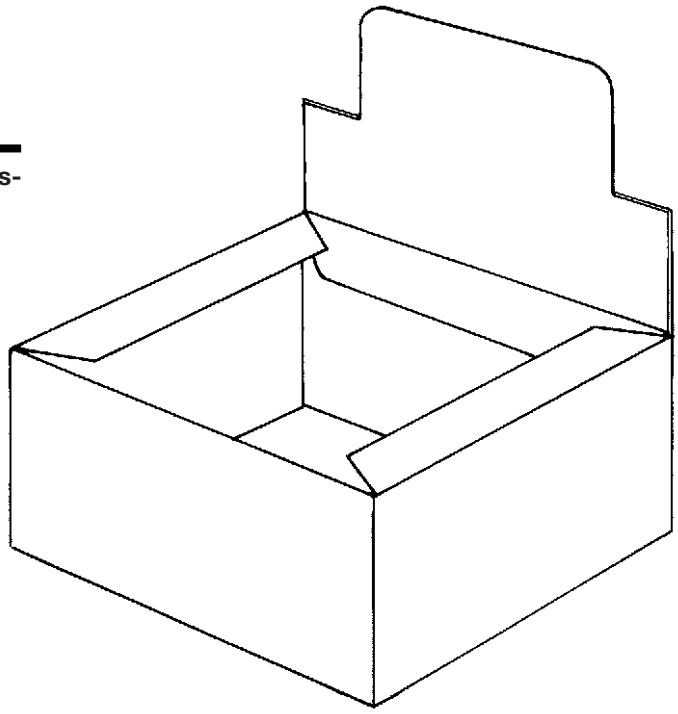


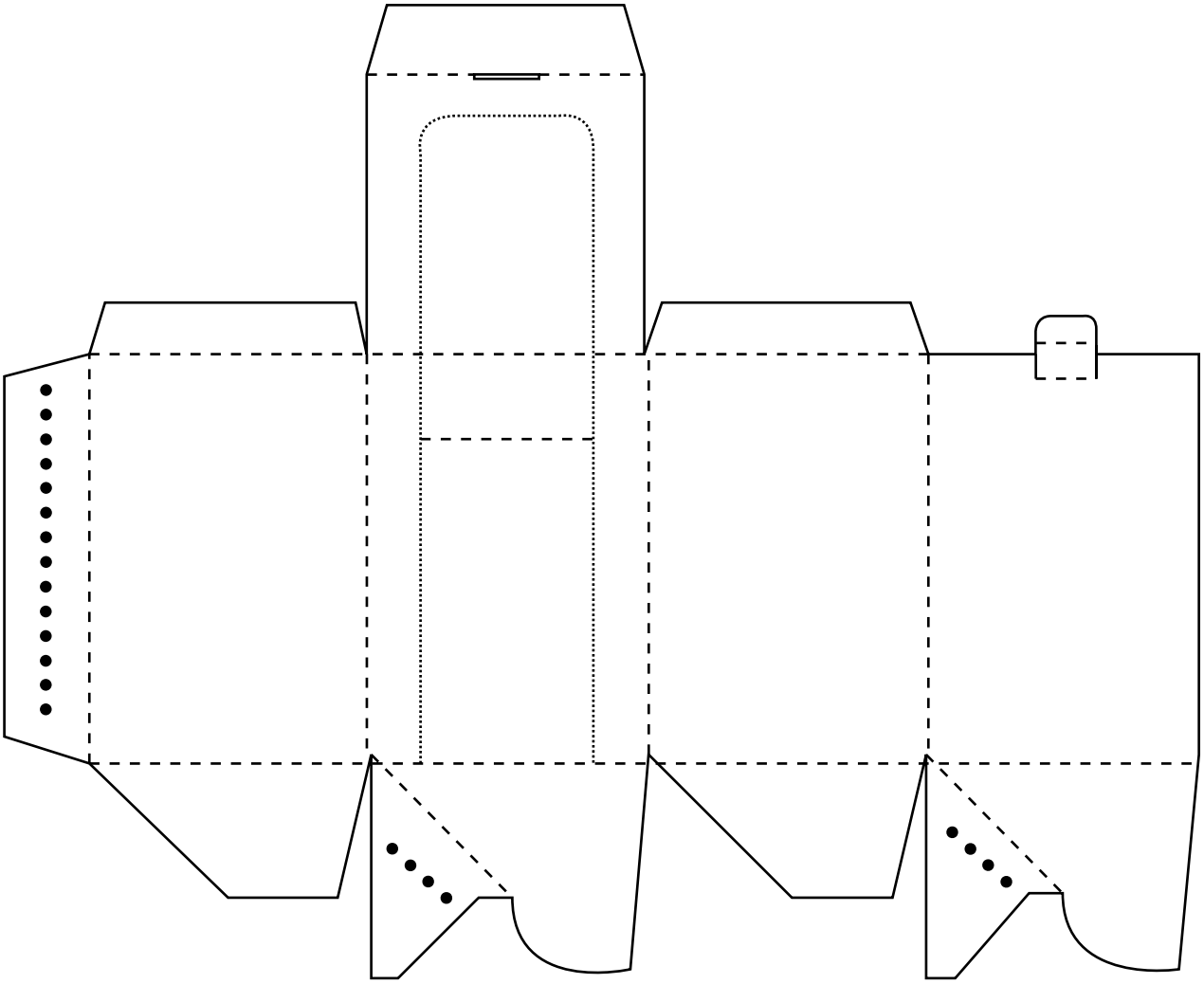


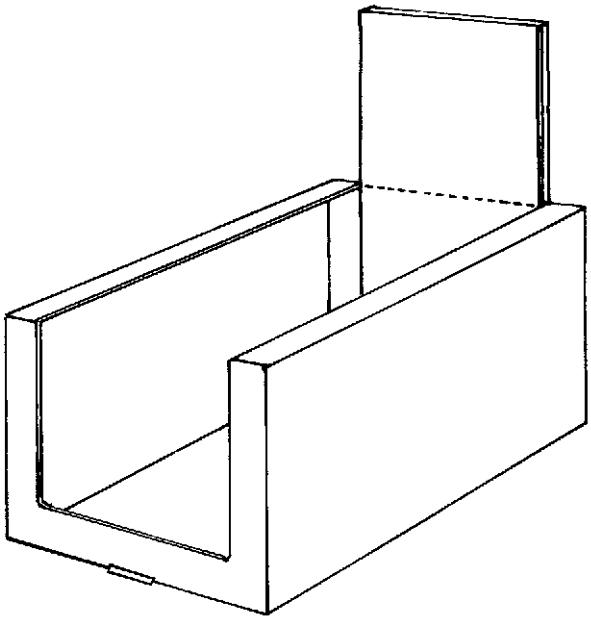




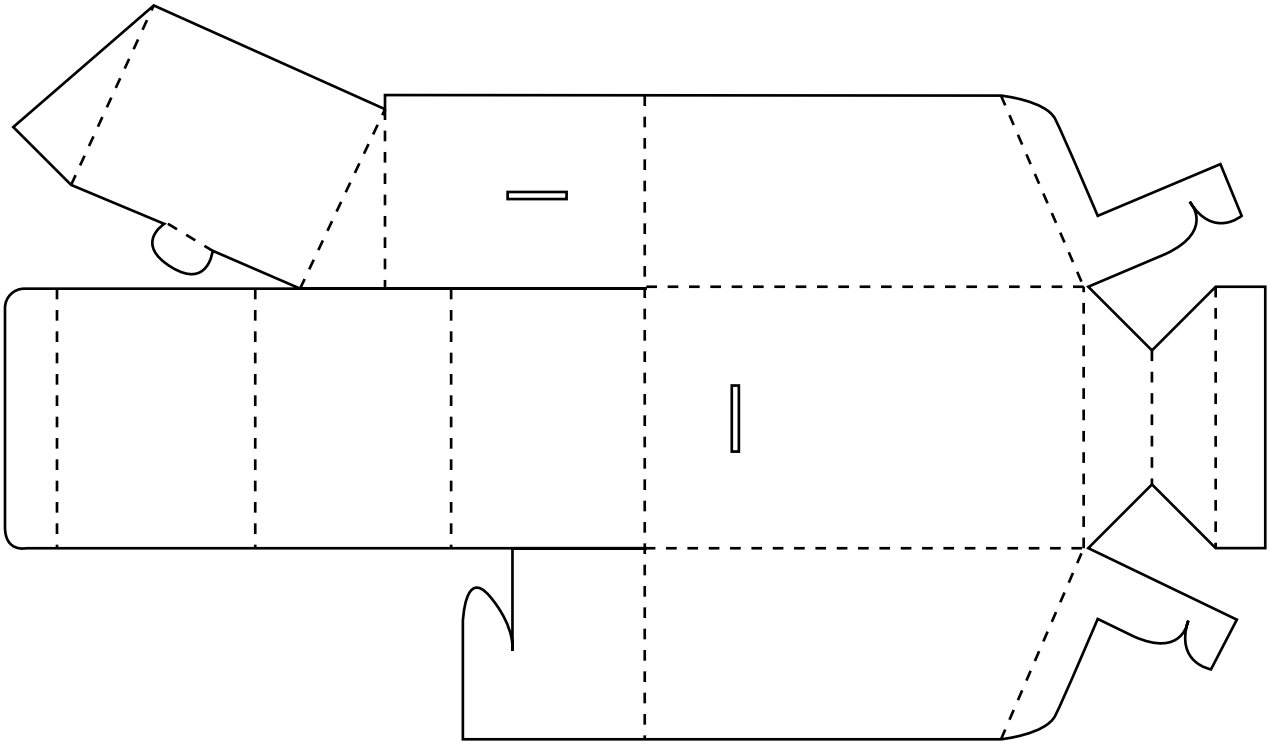
The lid is prescored and perforated to create a display panel when opened.



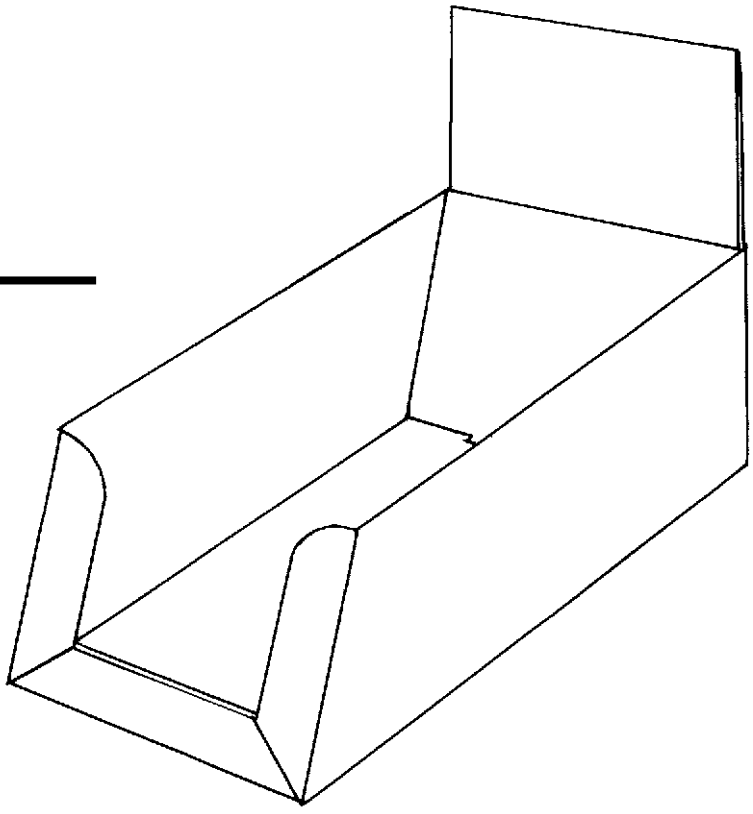


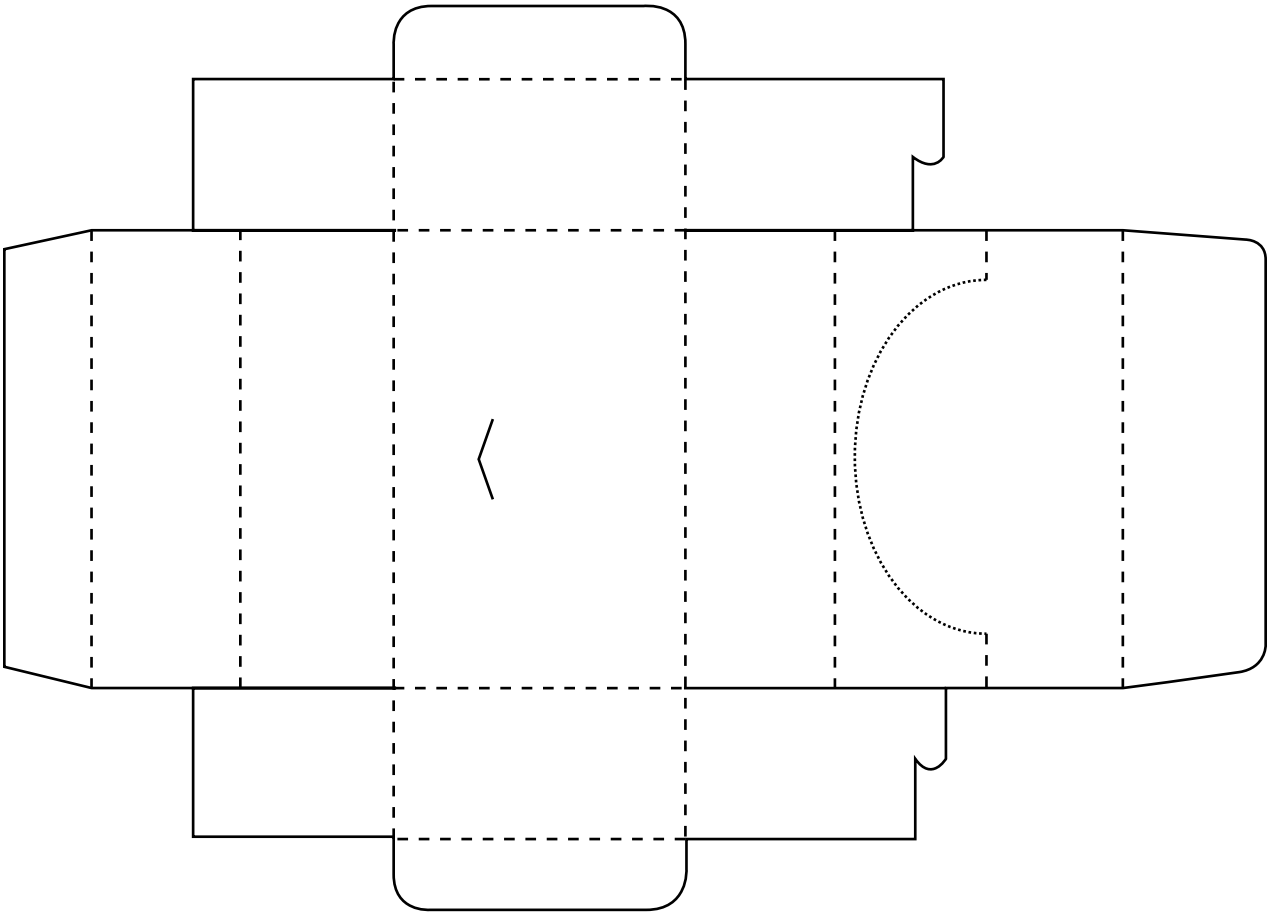


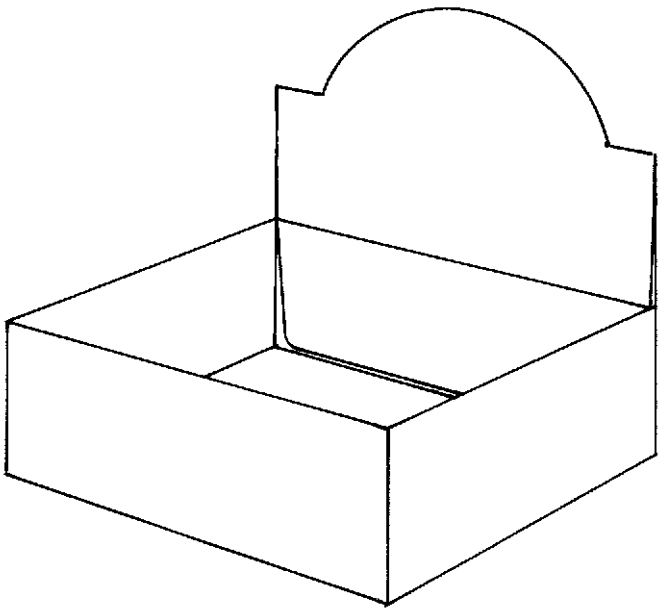
The perforated panel doubles as a header.

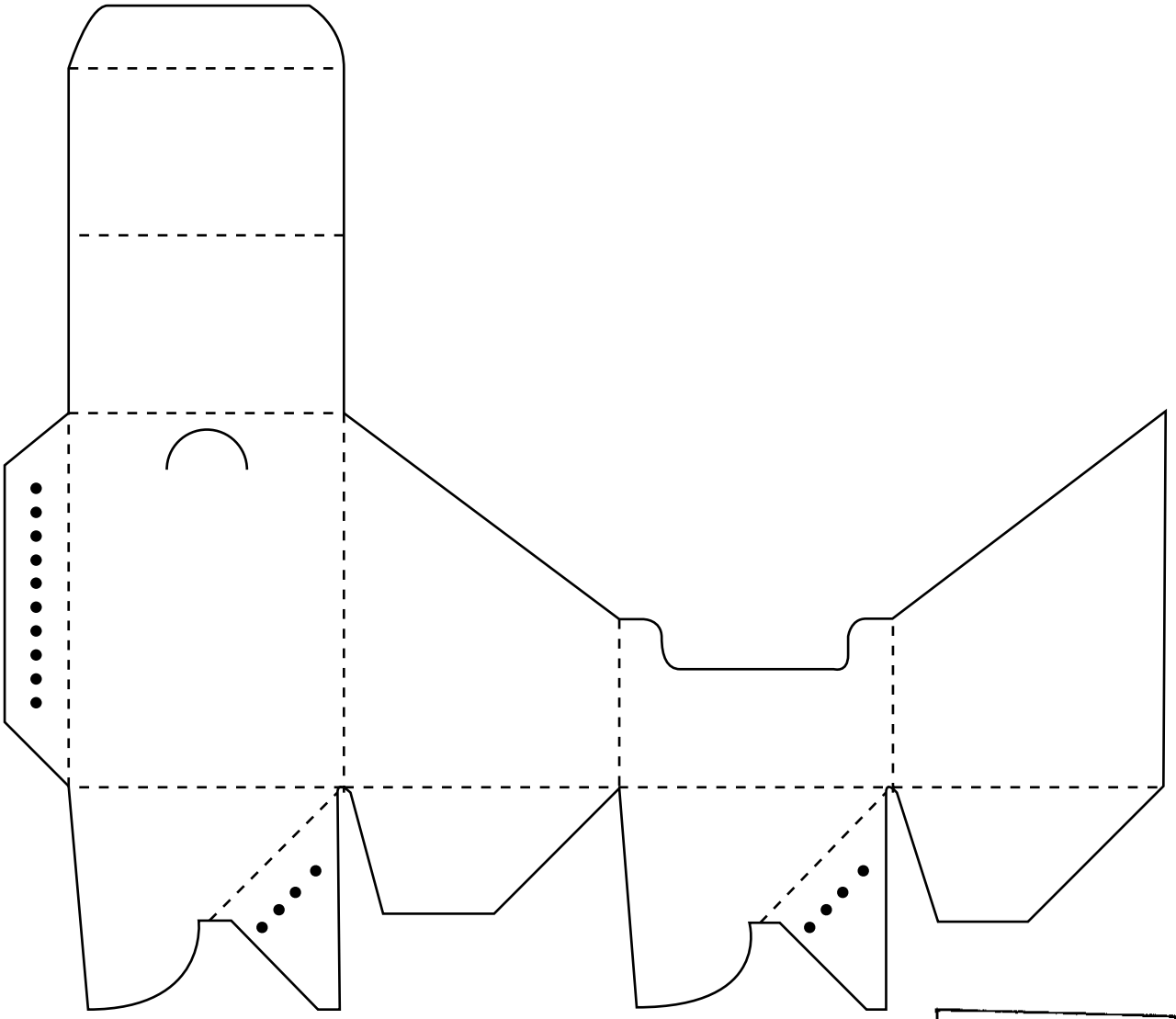


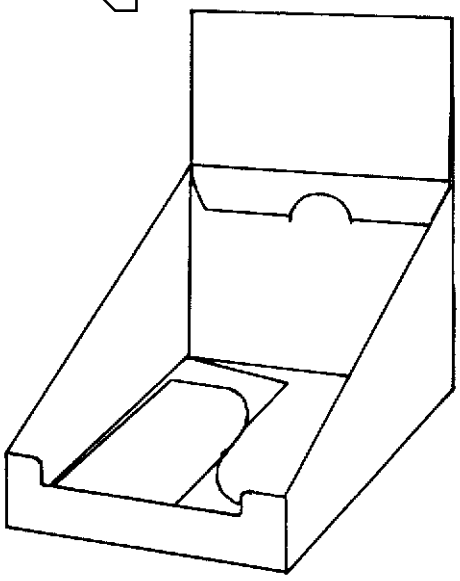
Assembly requires no glue

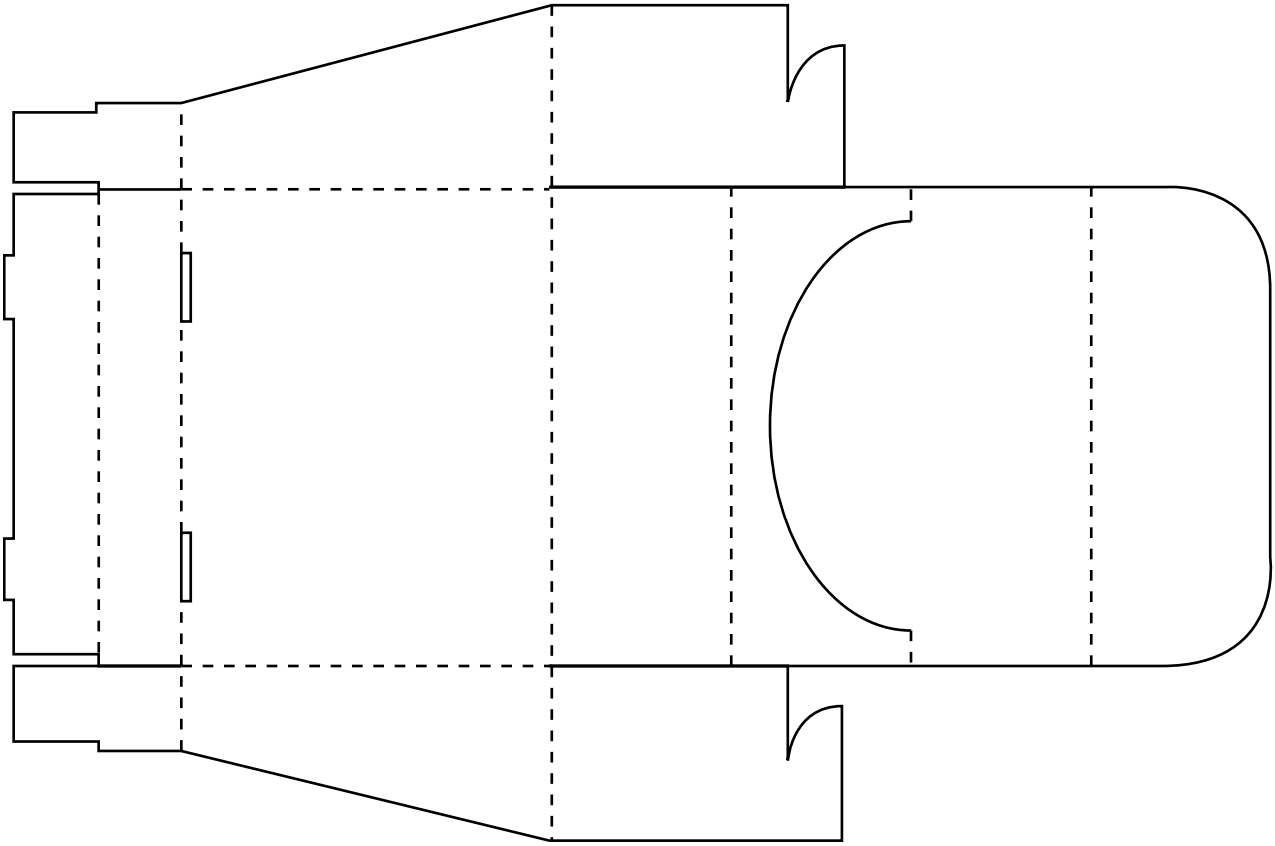


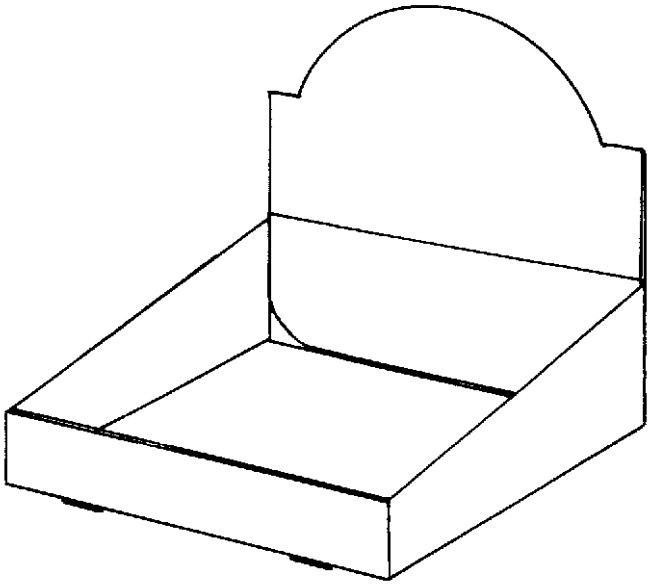




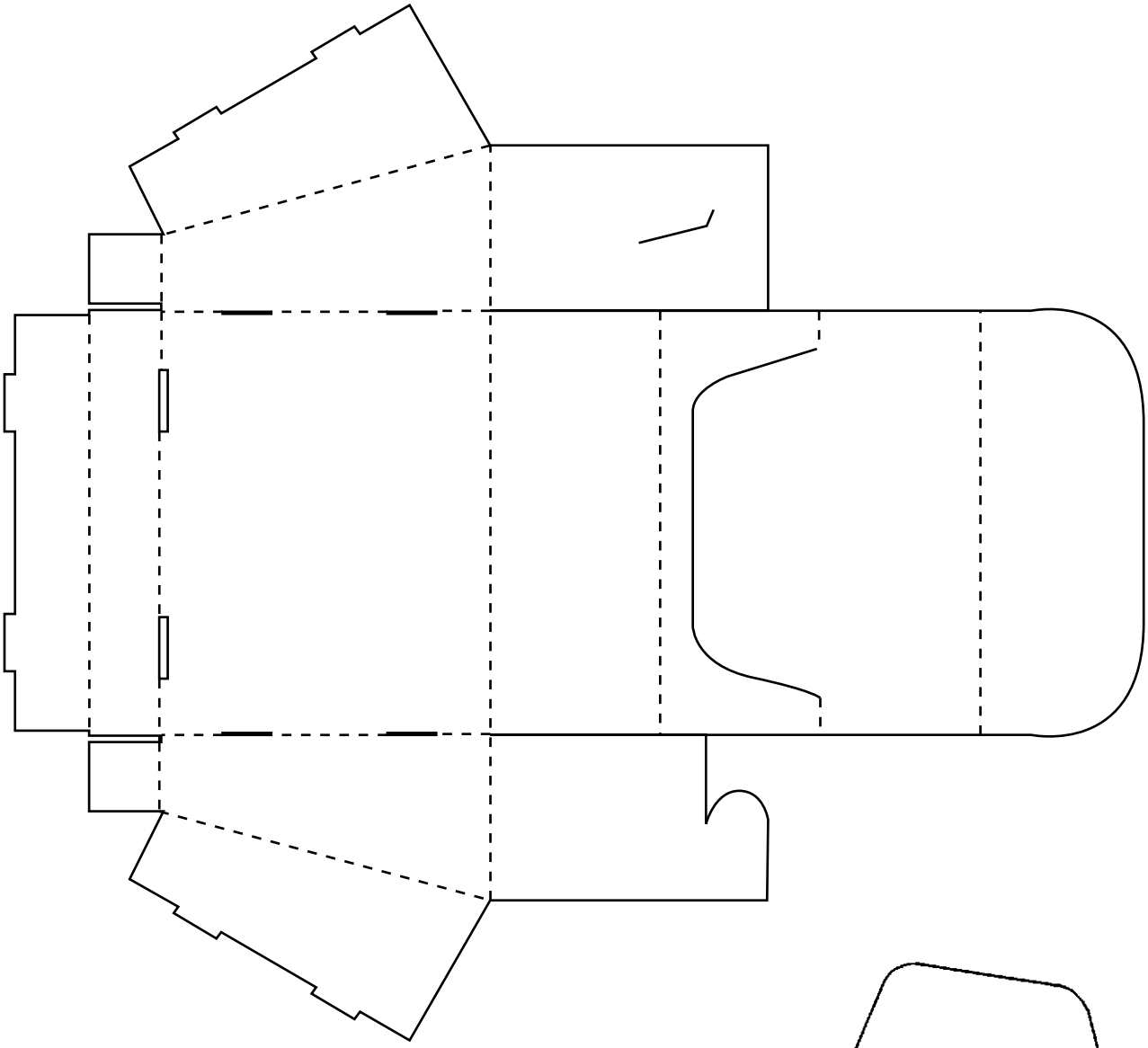


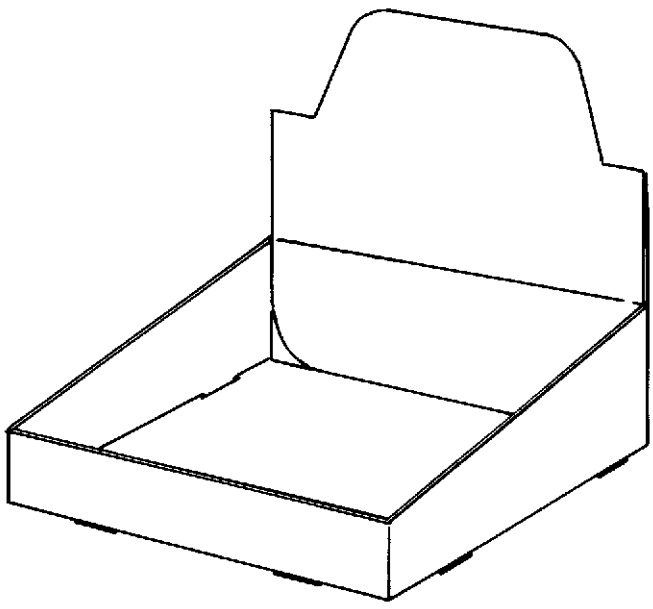


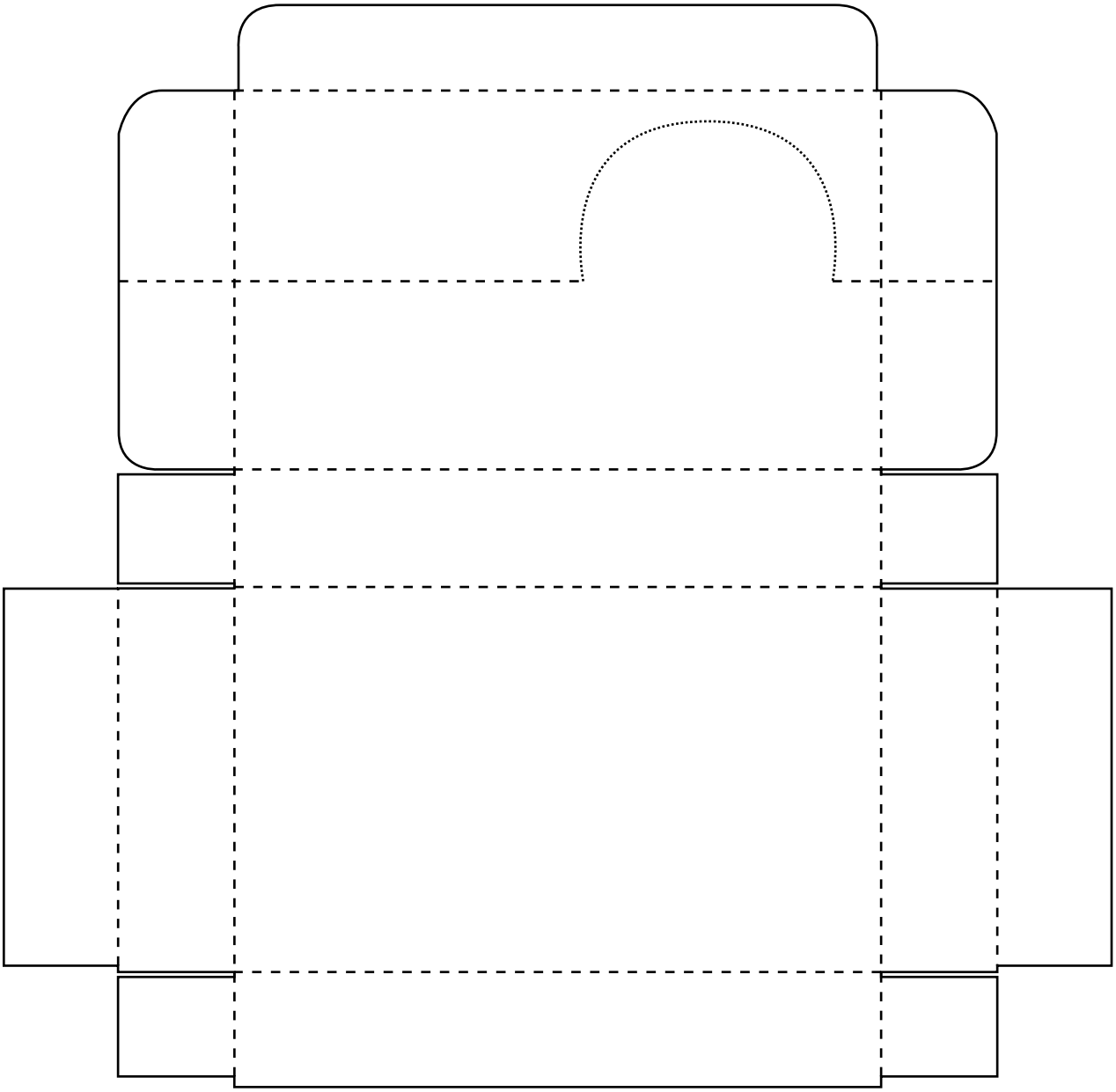


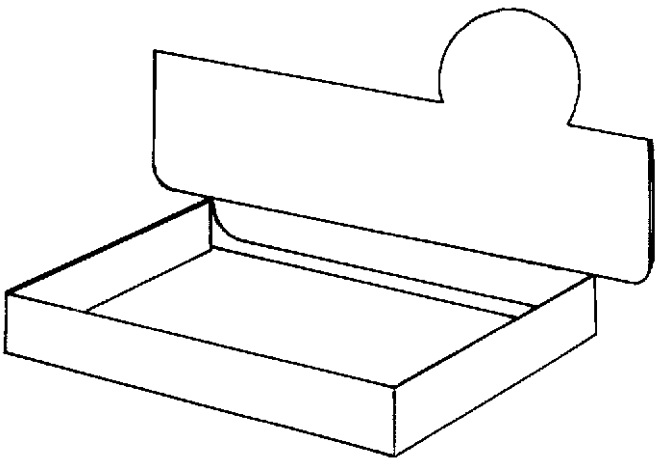


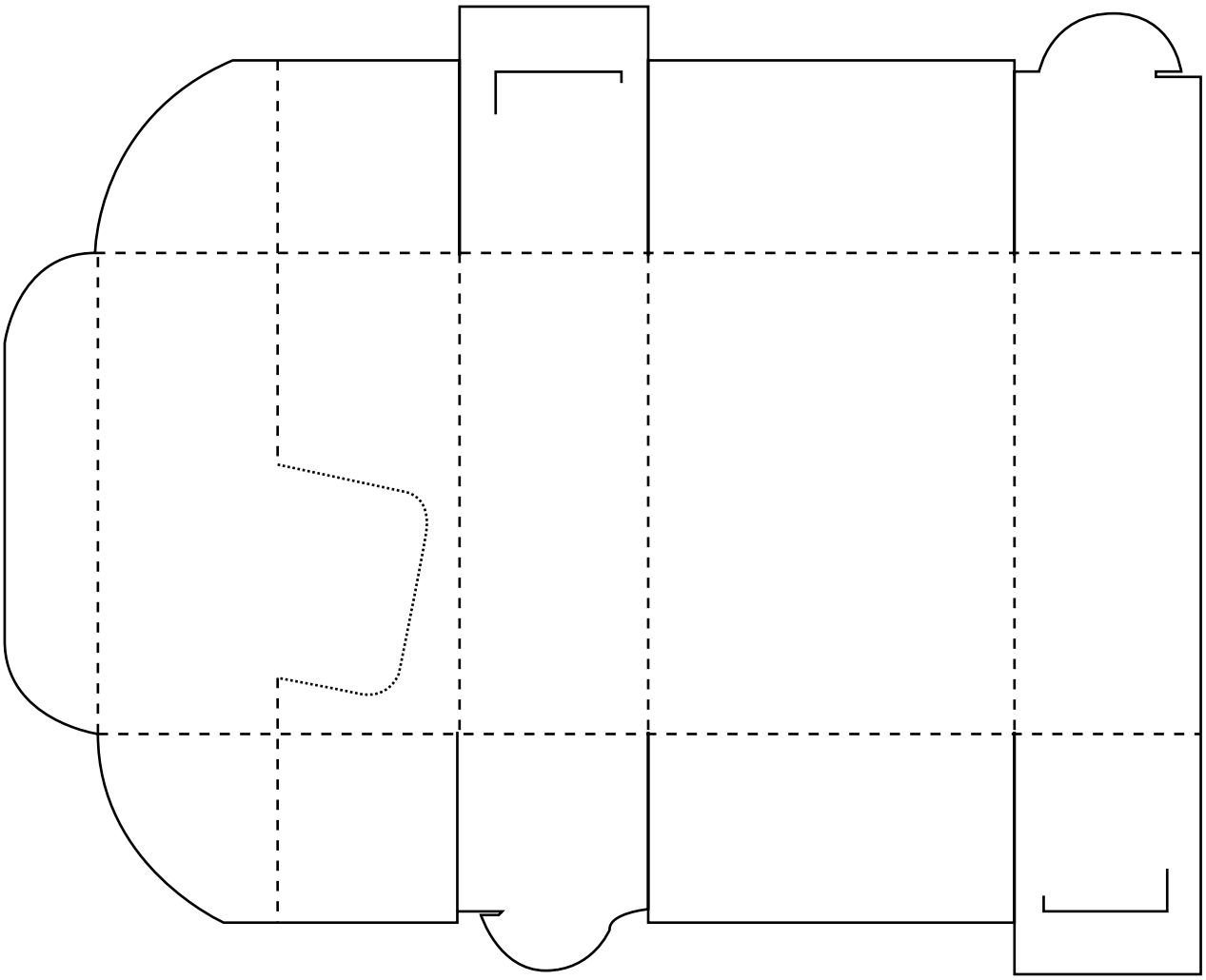
DOUBLE FRONT, DOUBLE SIDE PANEL DISPLAY WITH HOOK LOCK AND WALKER LOCK COMBINATION

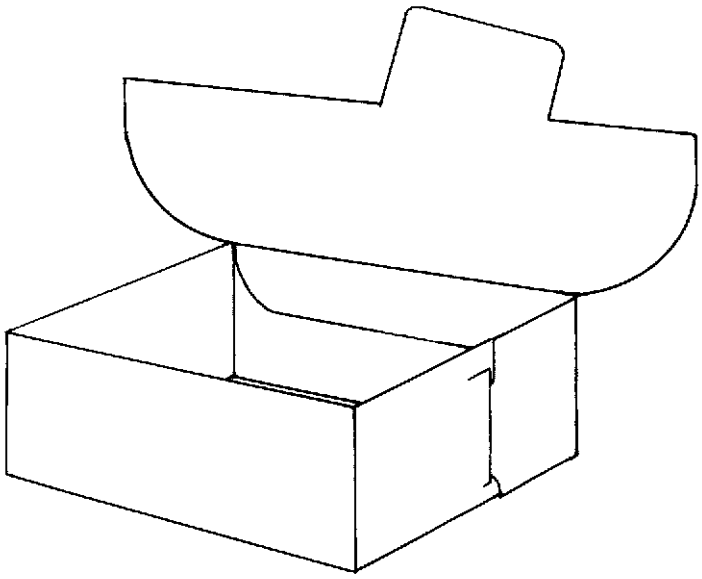


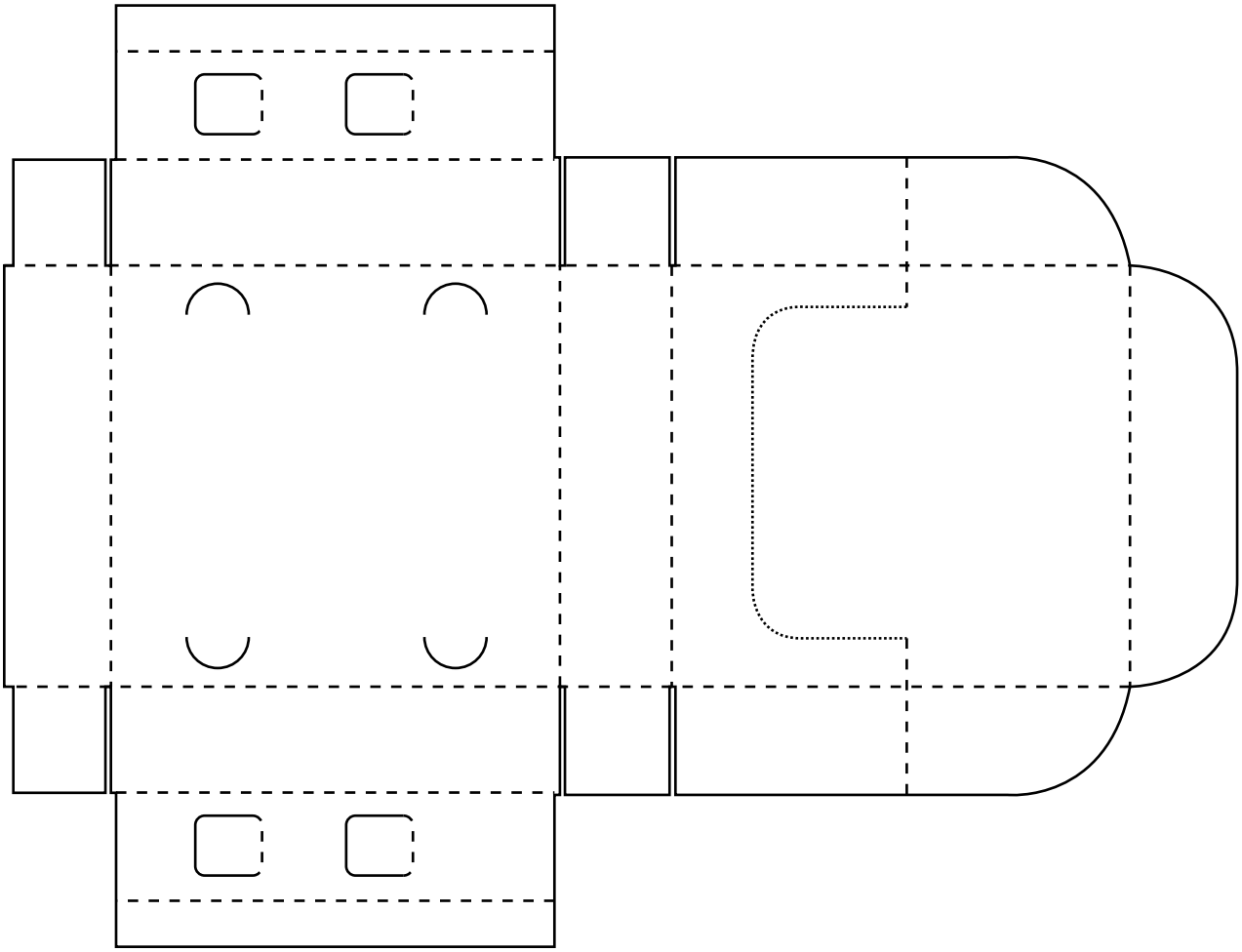


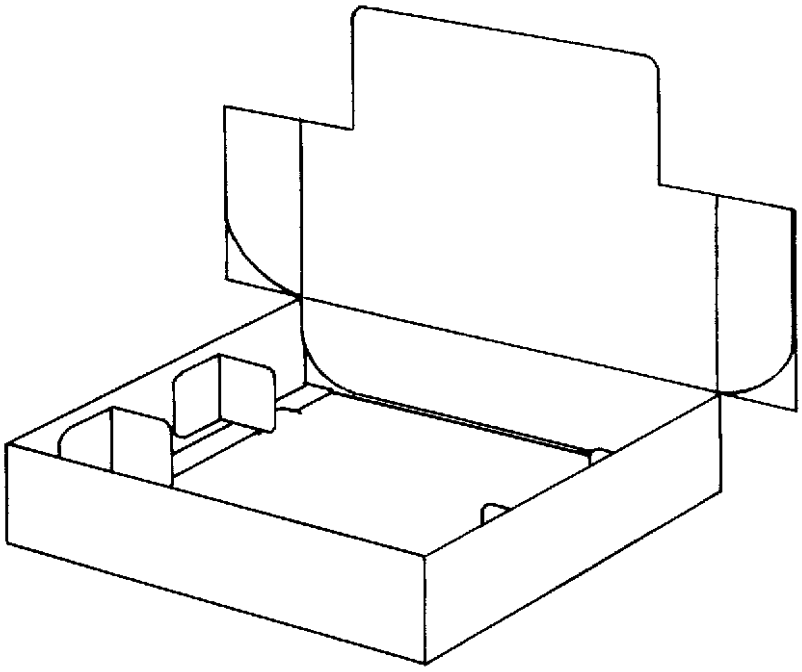


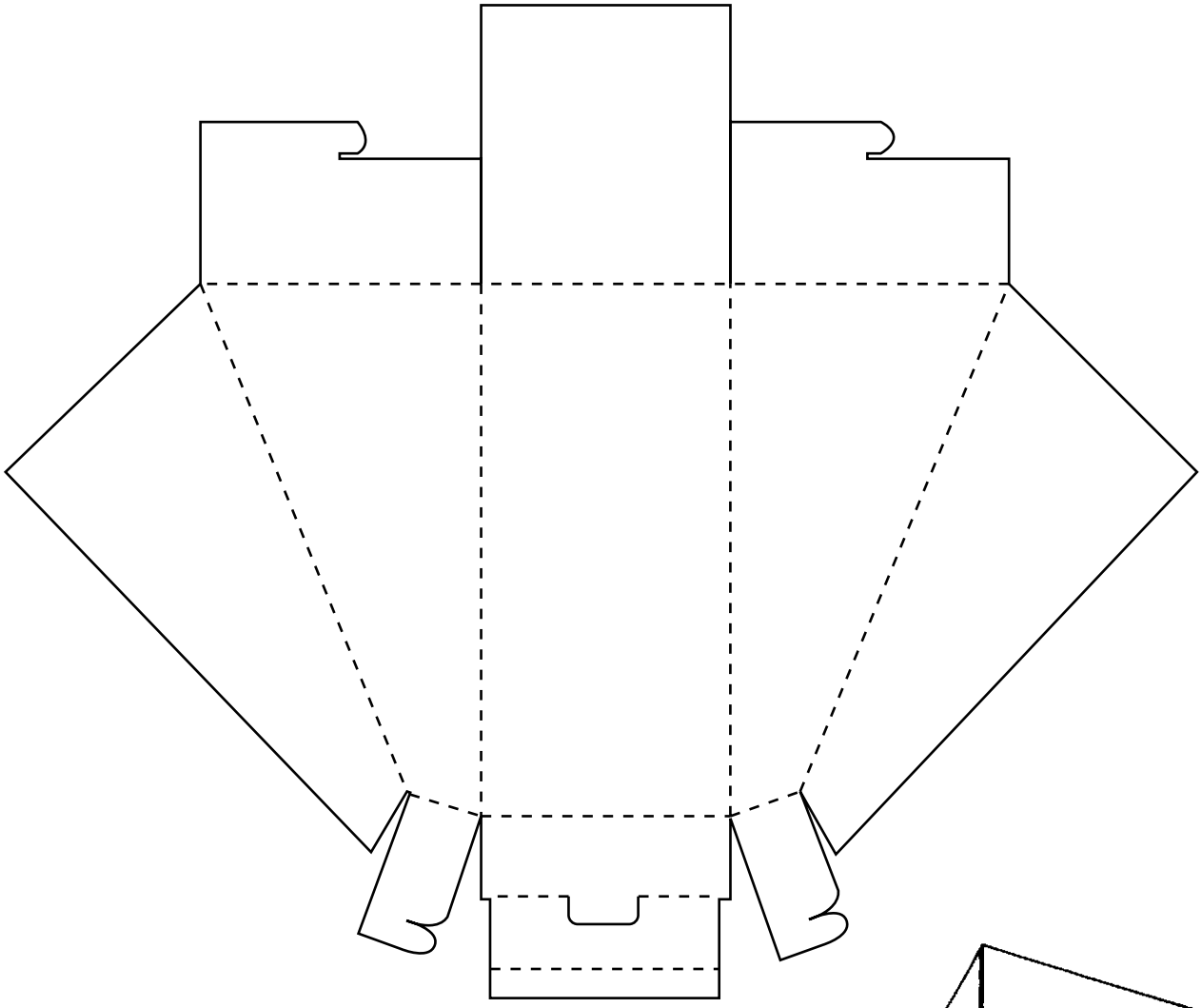


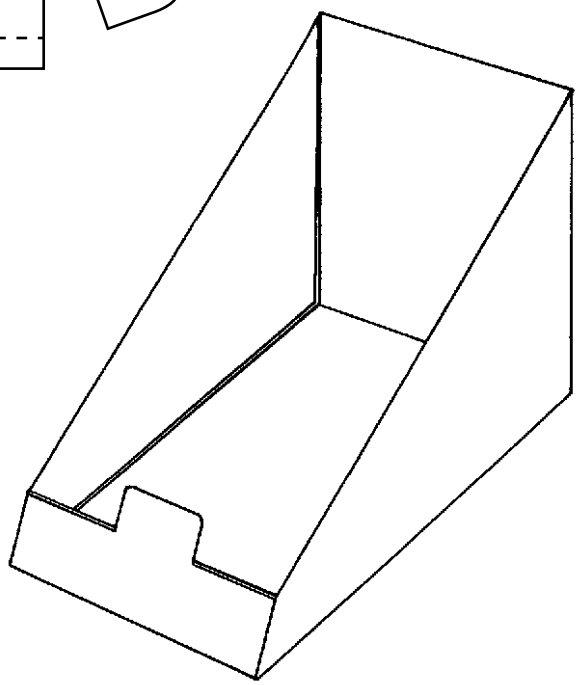






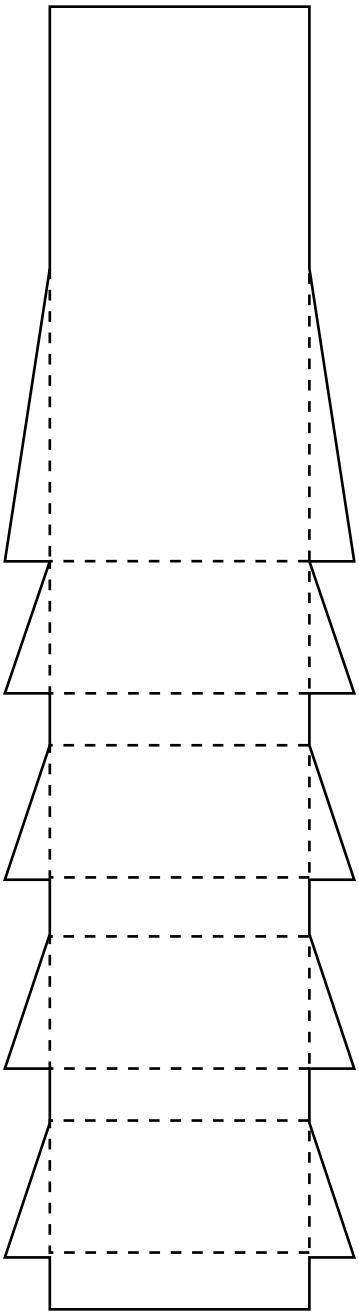


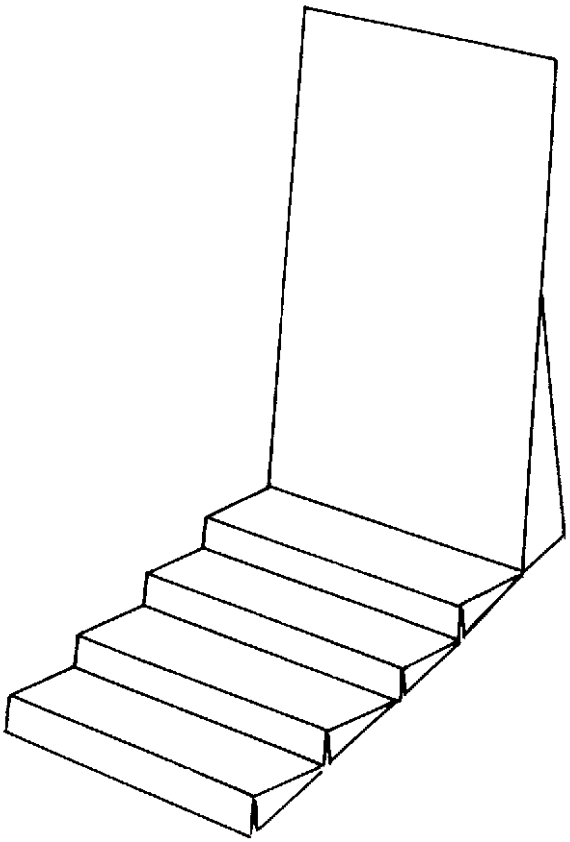


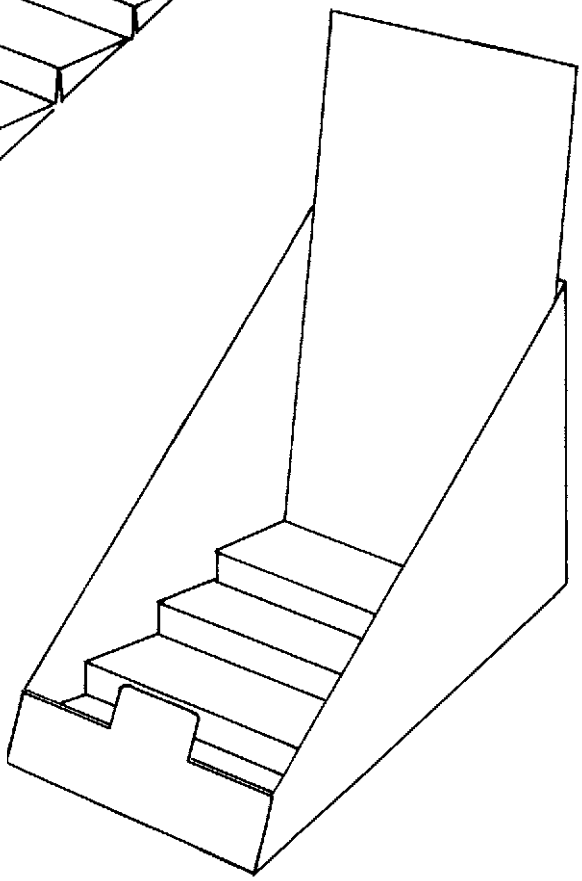


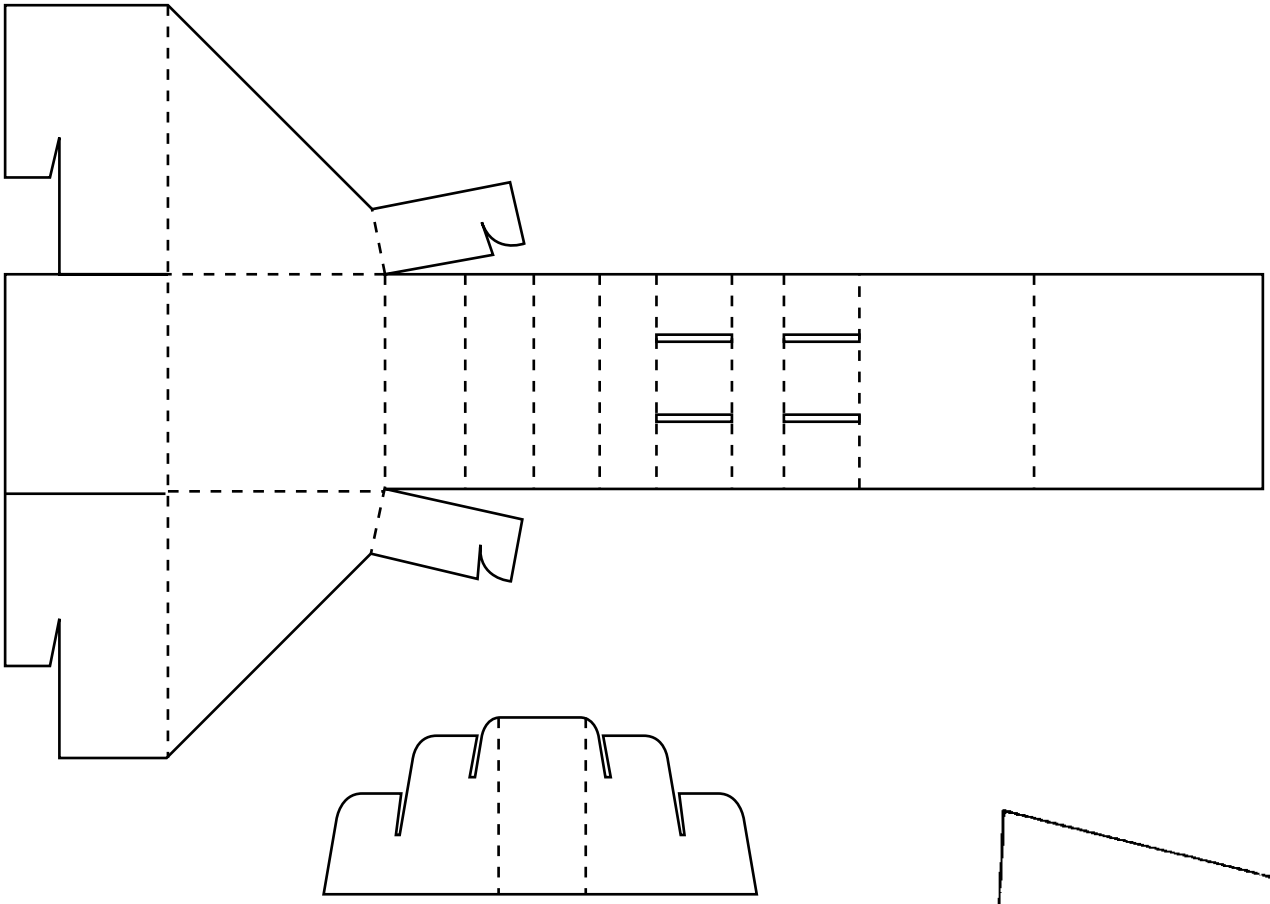
This is a patented type of display construction.

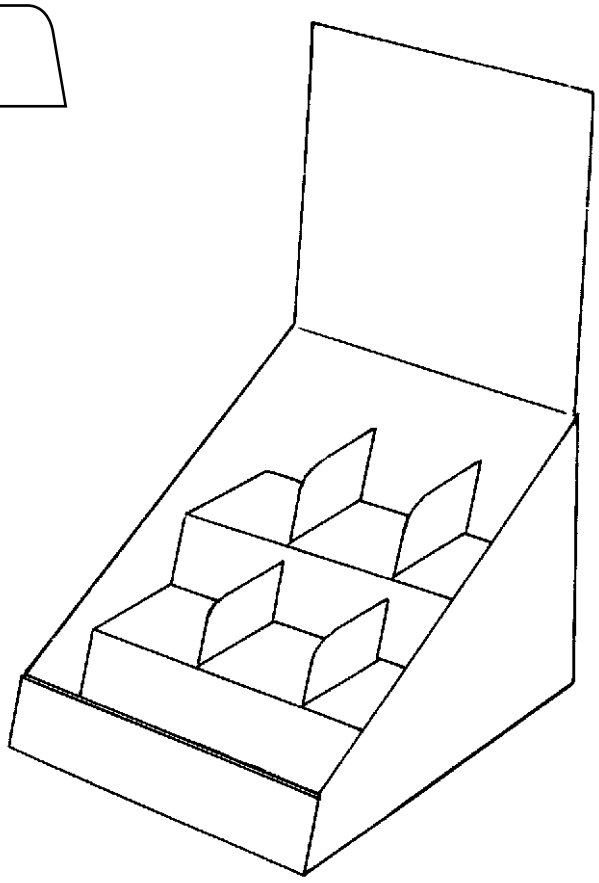
STEP INSERT AND HEADER FOR RHOMBOID DISPLAY ON
PREVIOUS PAGE



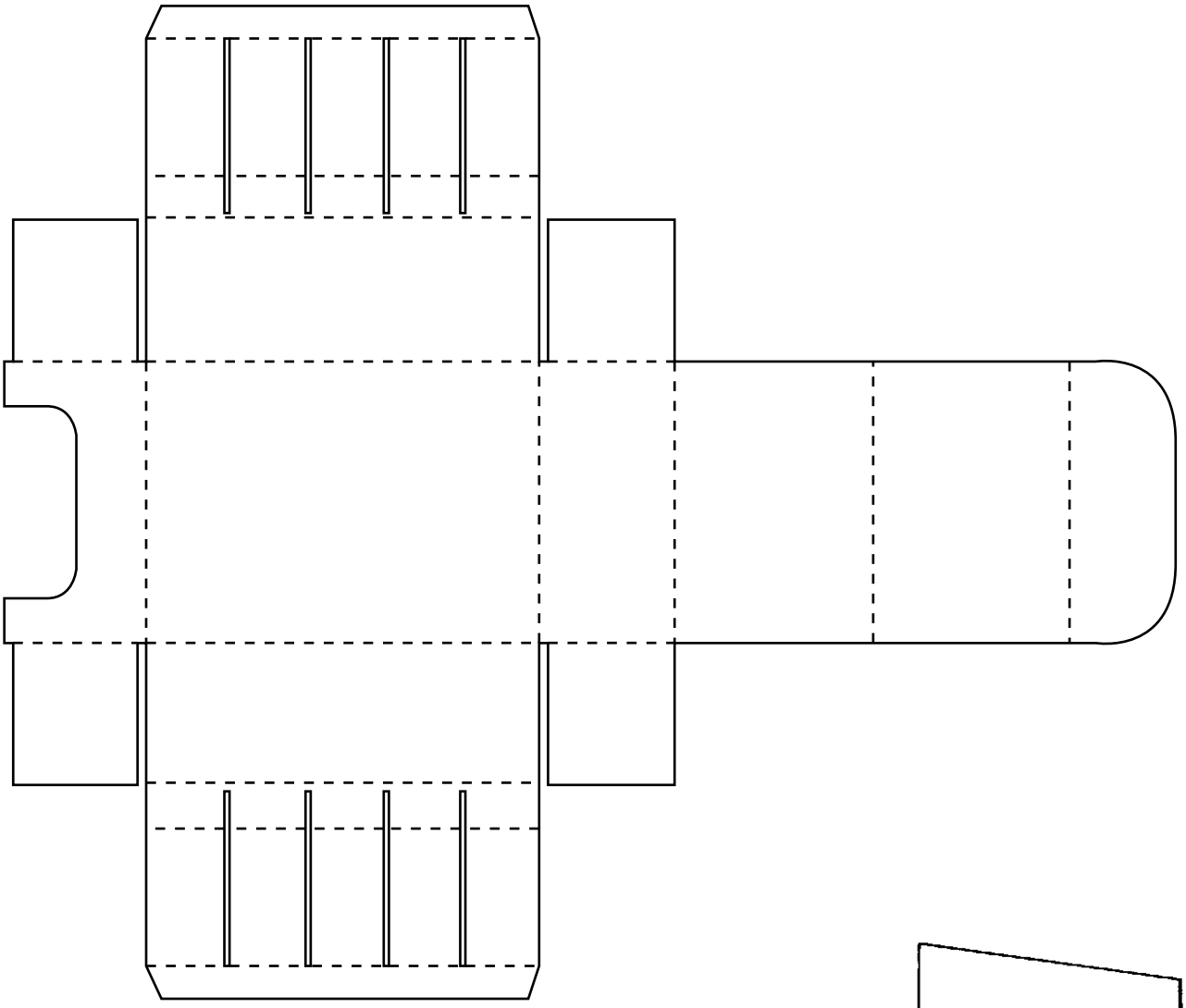




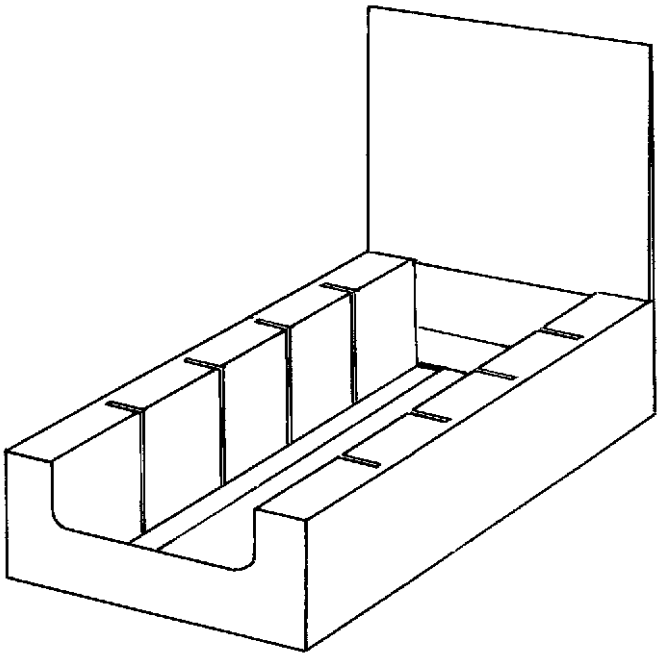


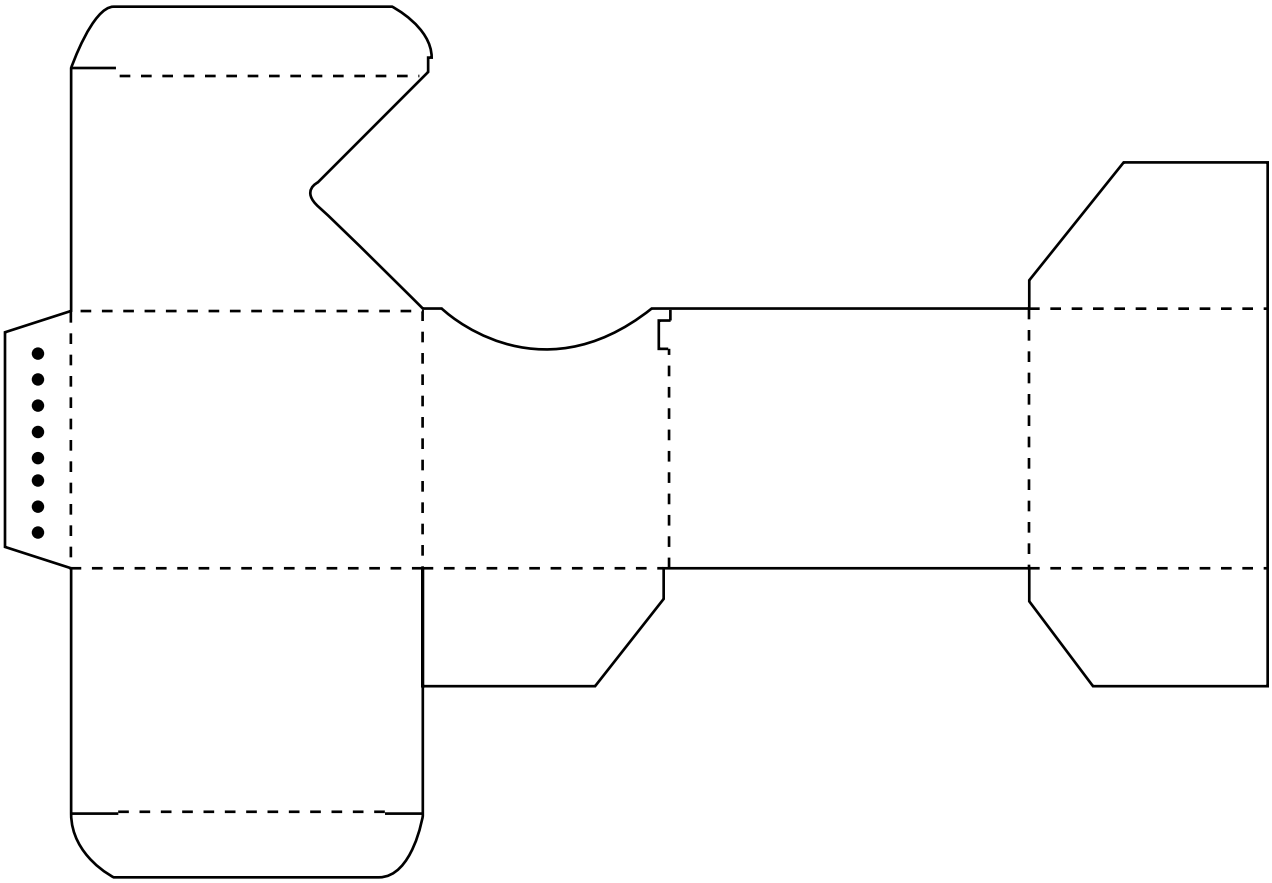


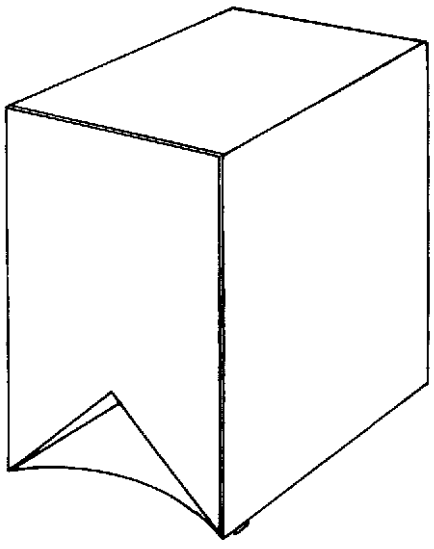
This is a patented variation of the rhomboid type of display container.

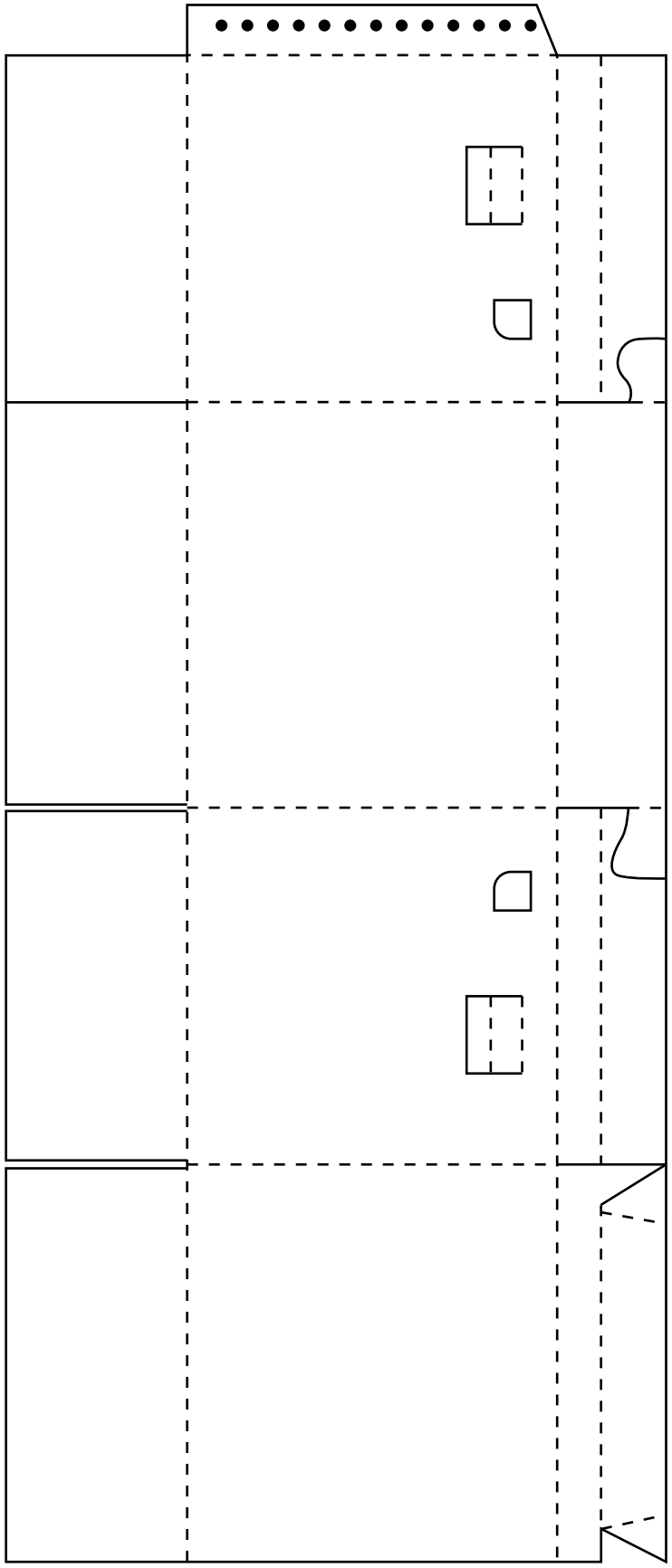


The slits in the inner walls permit placement of carded products.

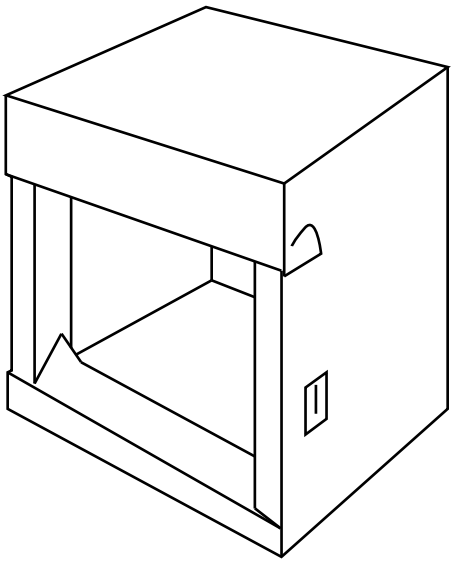


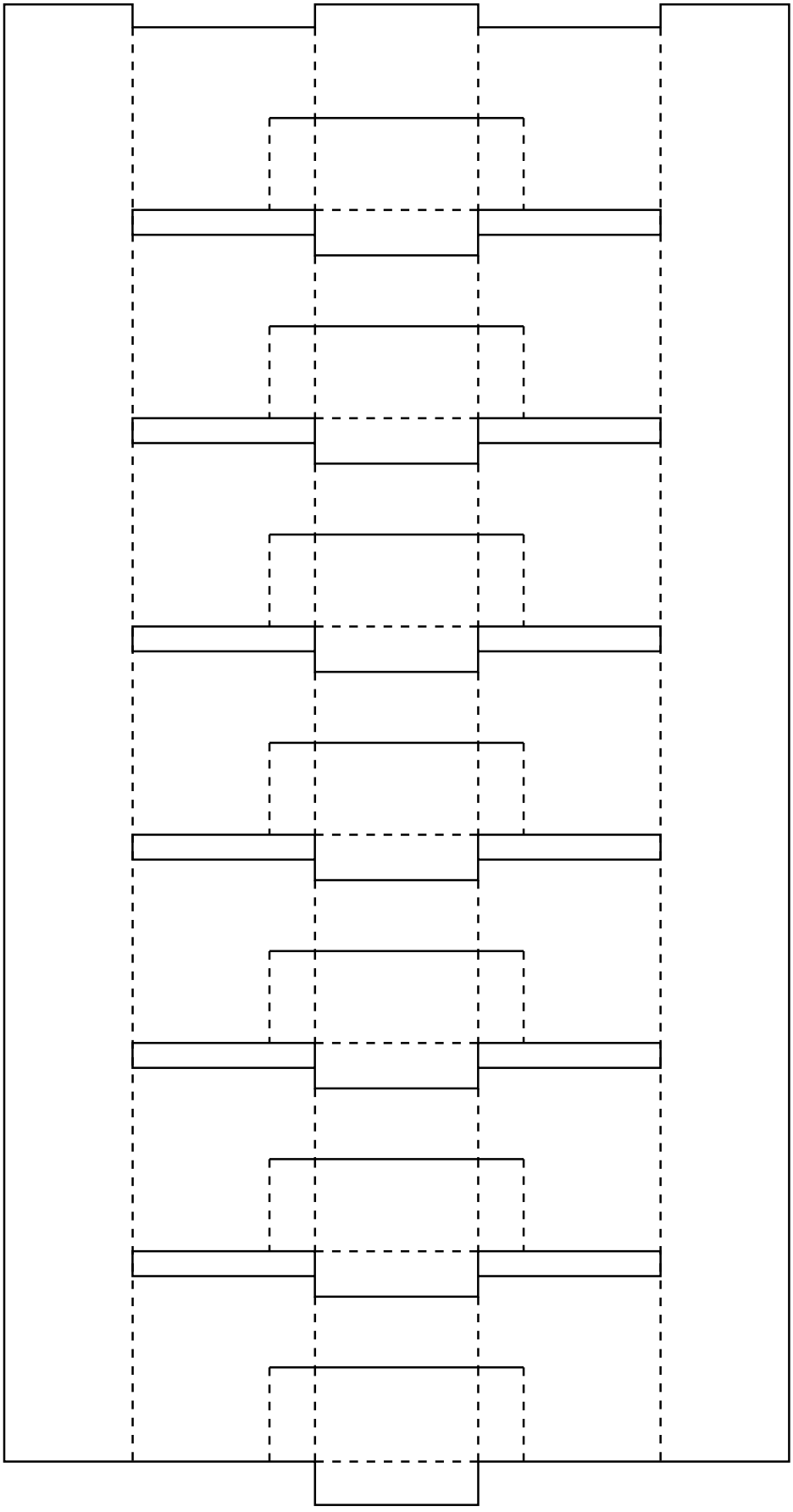


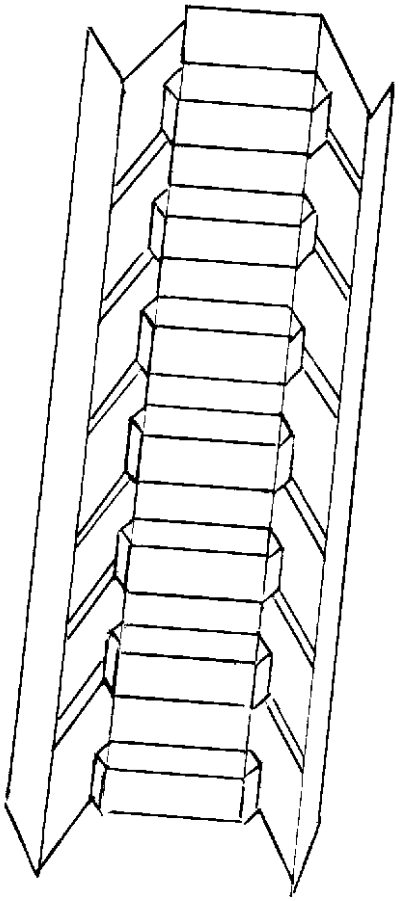


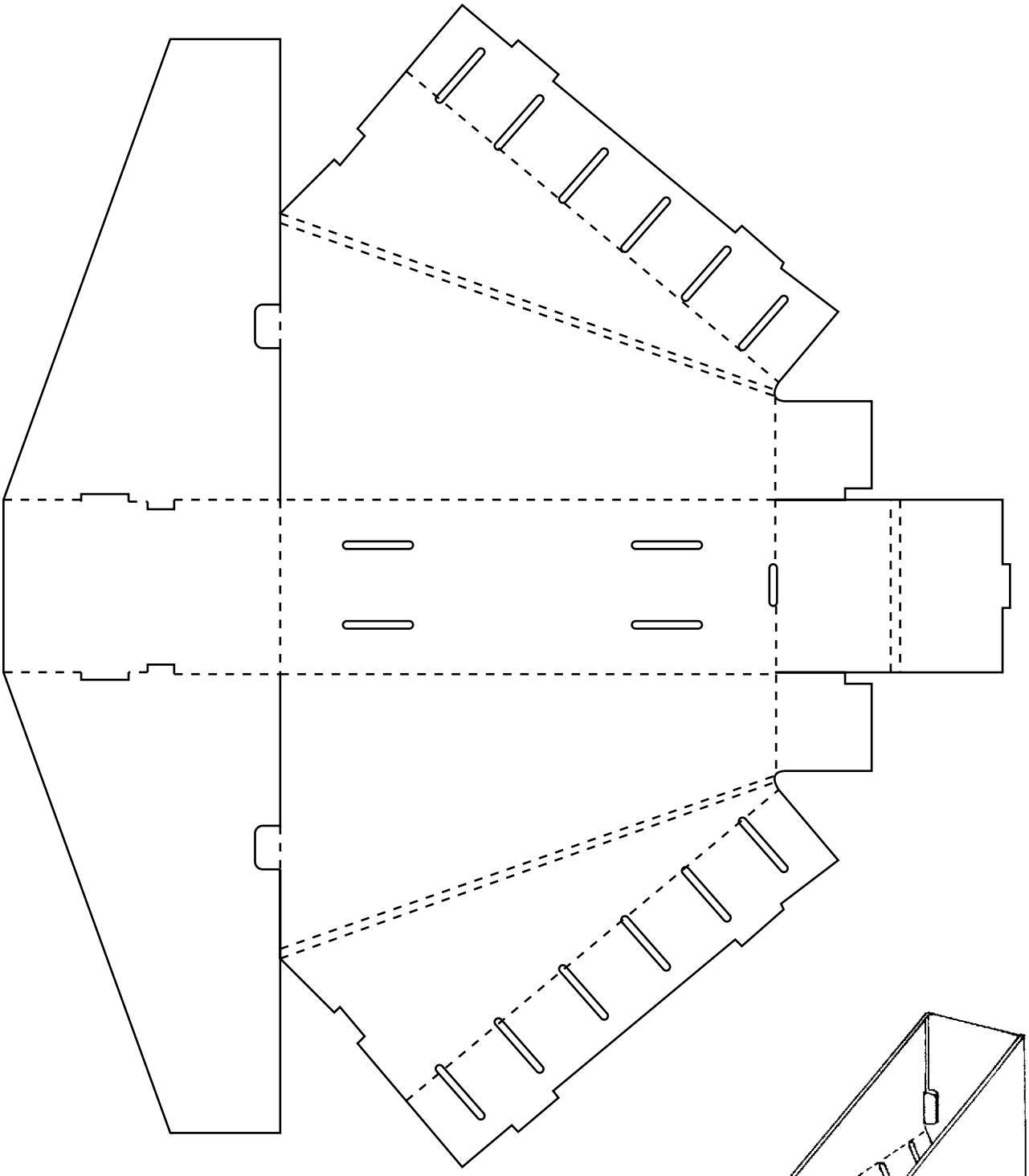


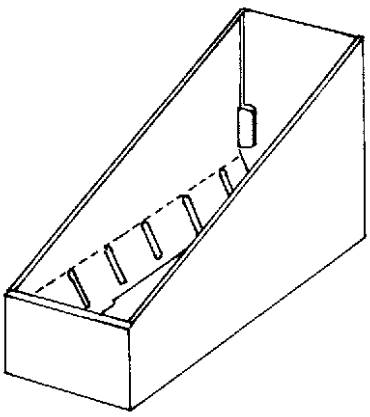
Grain Direction



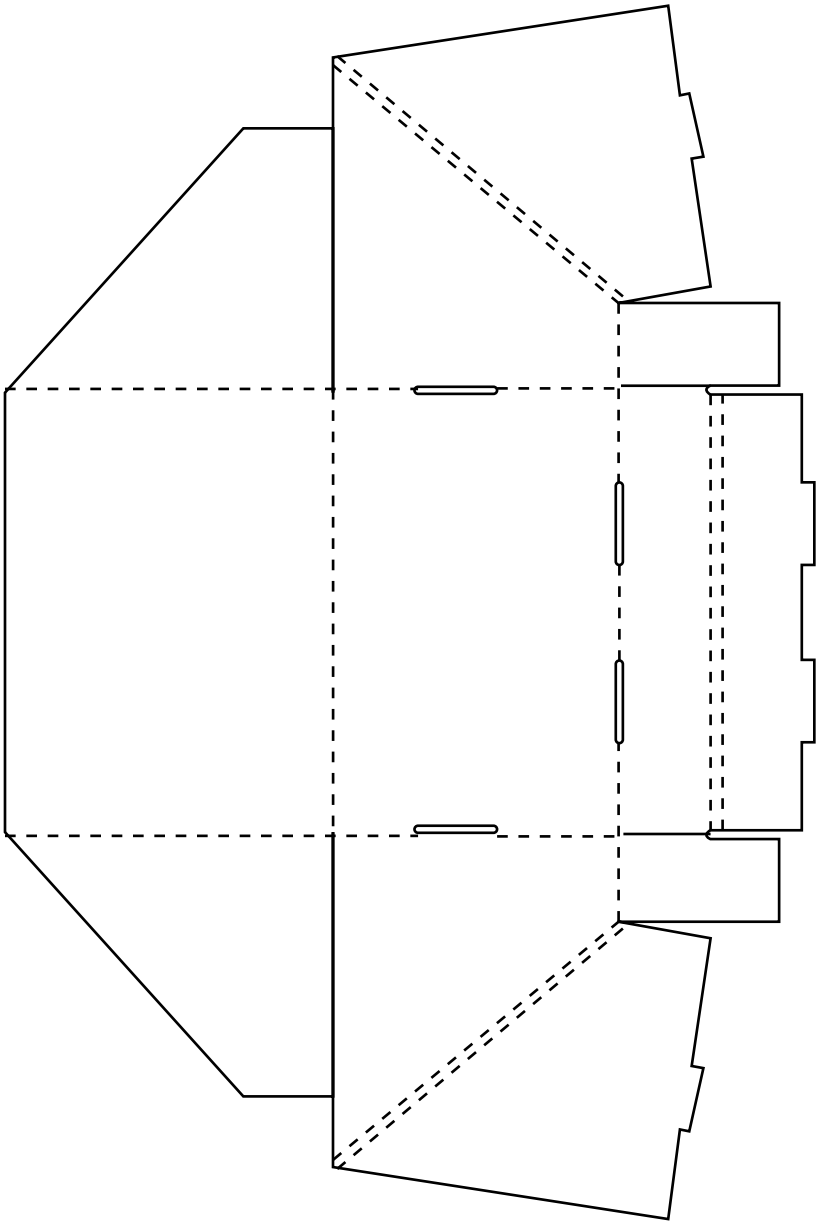


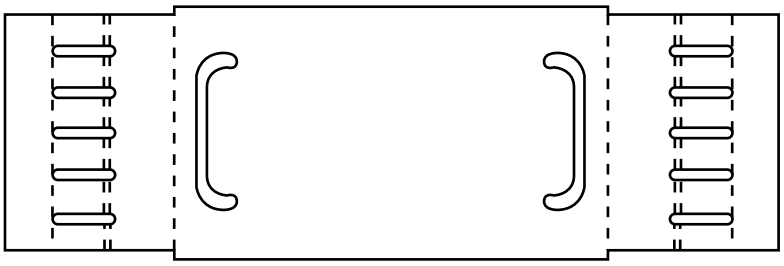


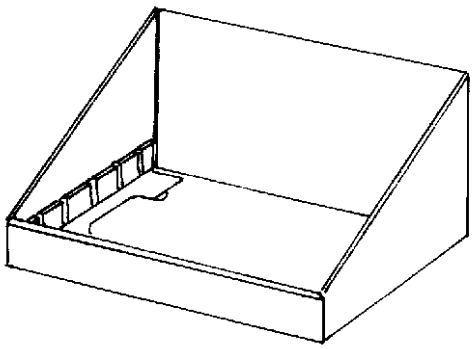




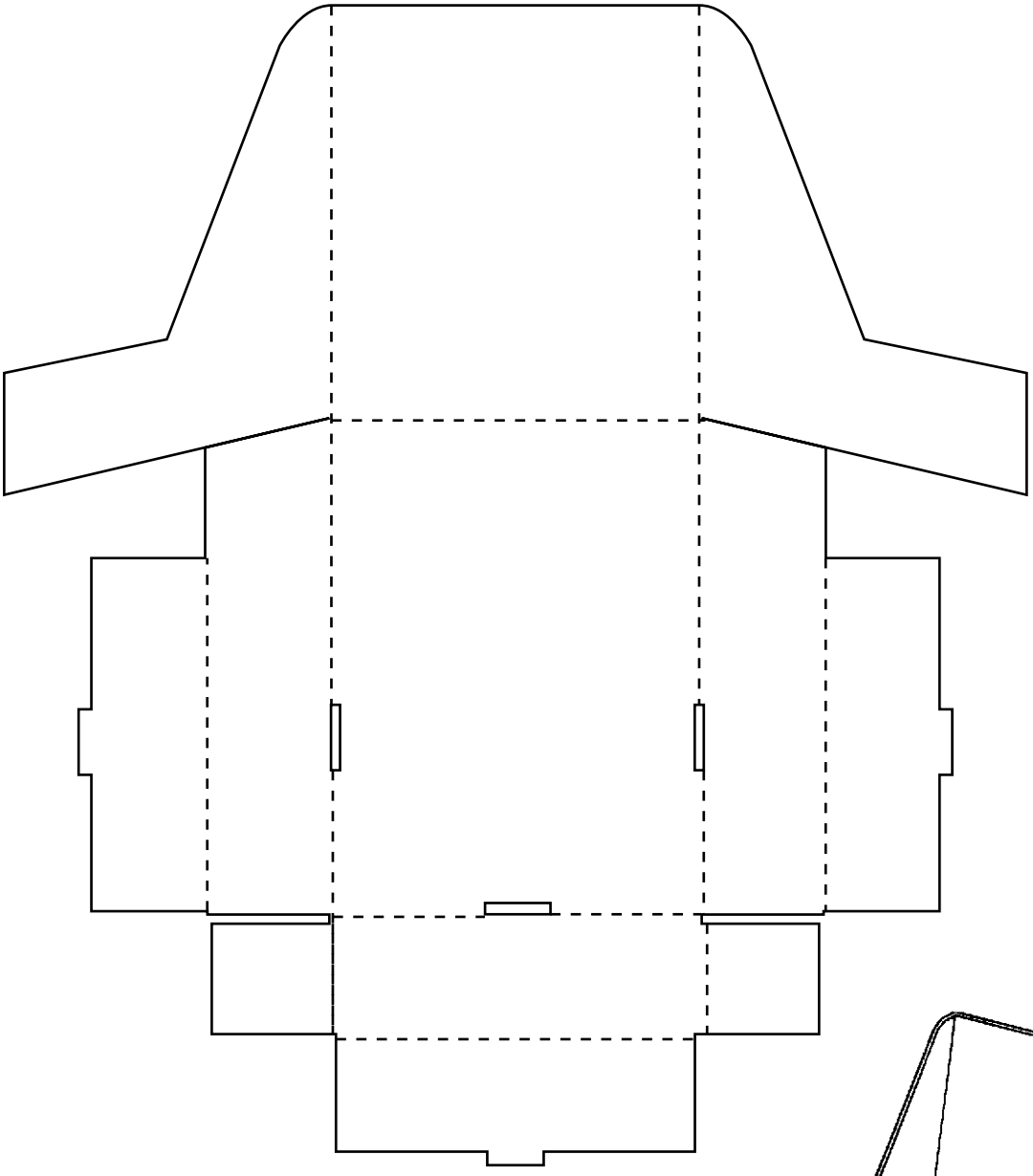
This shipper-display unit has been configured for six-carded products. The slotted panels may be adjusted for fewer or more units to be displayed.

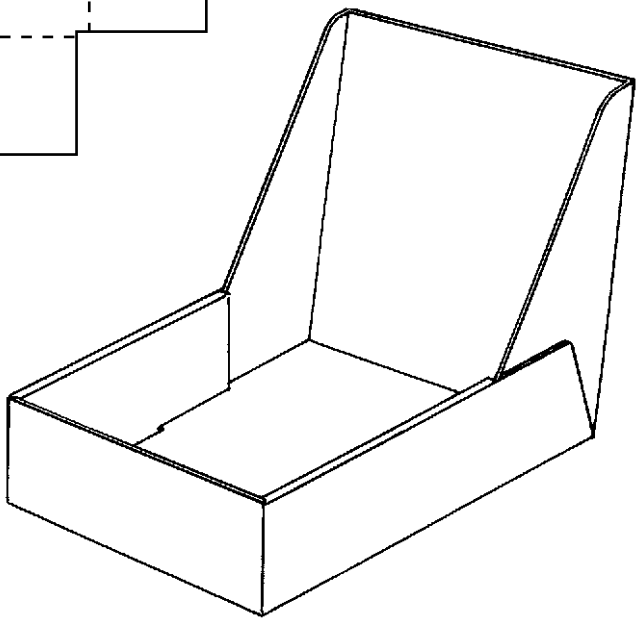


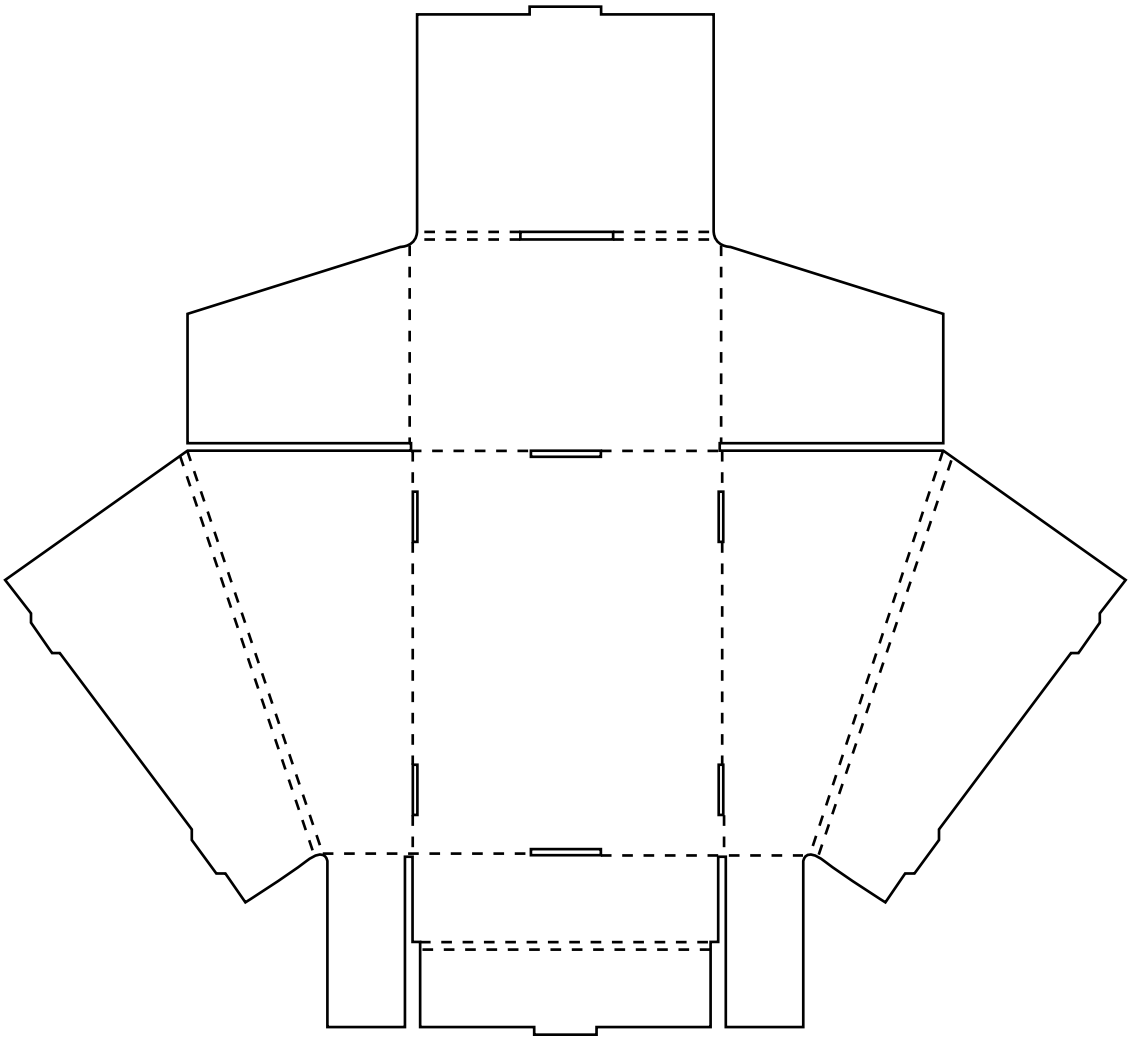




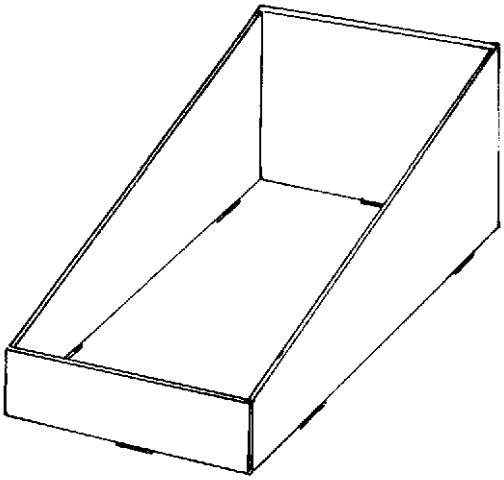
This two-piece container has an insert that is configured for carded merchandise.

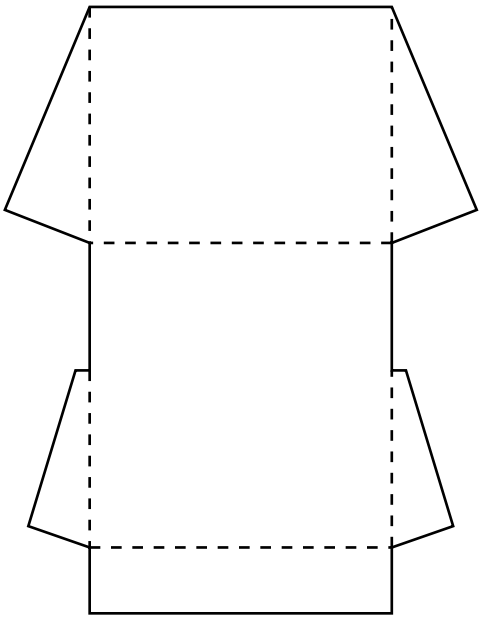


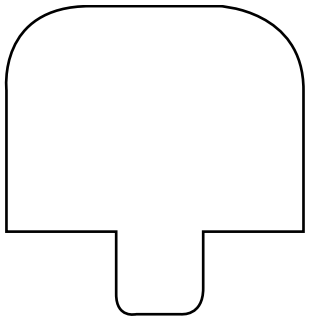




This double front wall, angled double side wall tray with Walker locks has a slit in the top of the double back wall to accommodate the separate header or riser illustrated on the next page.

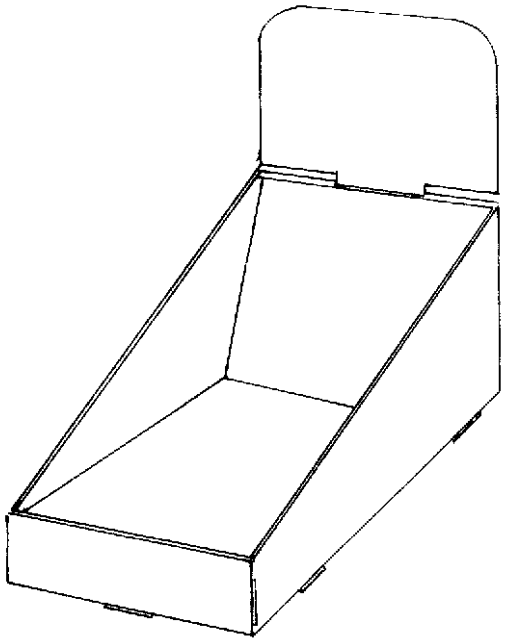




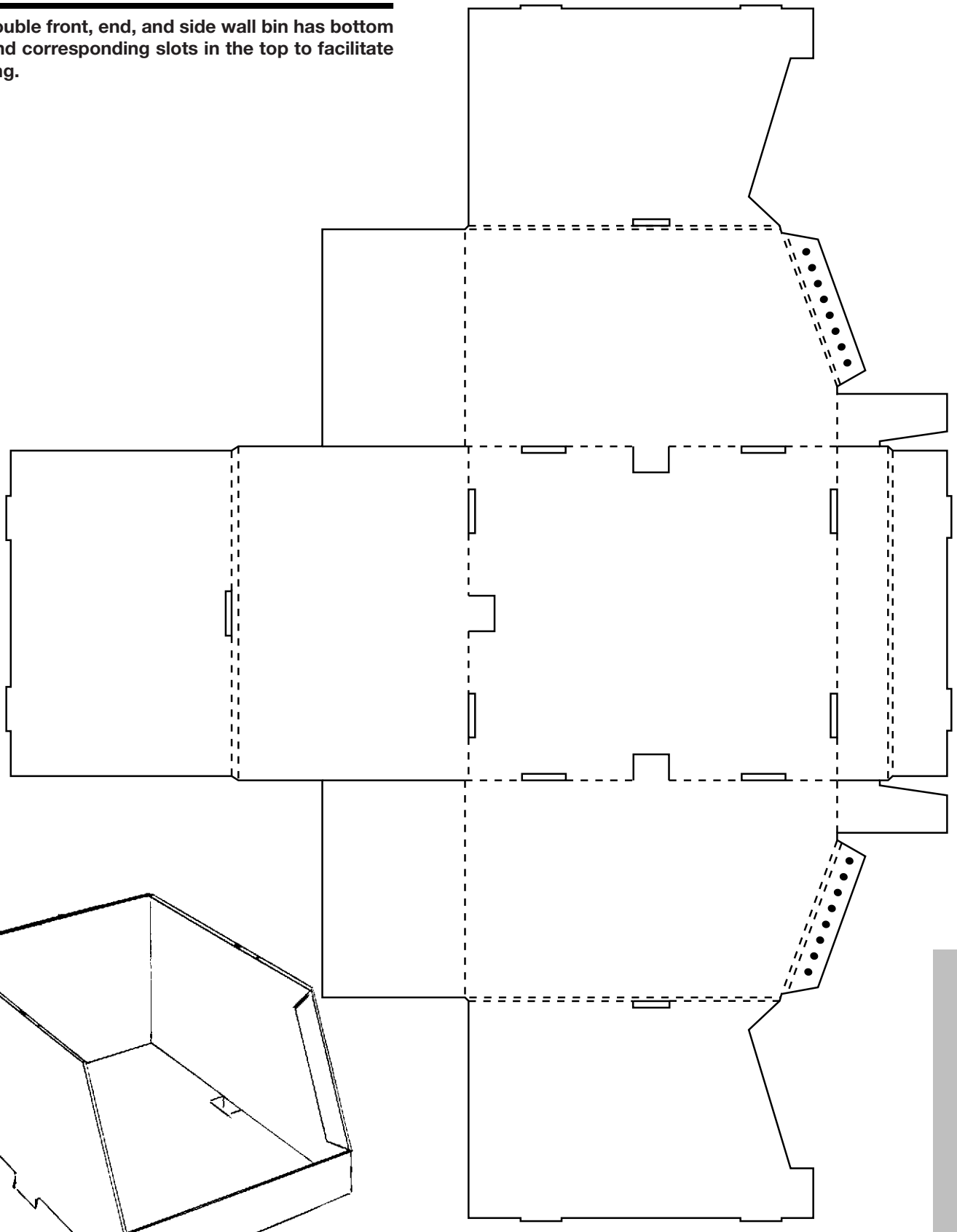


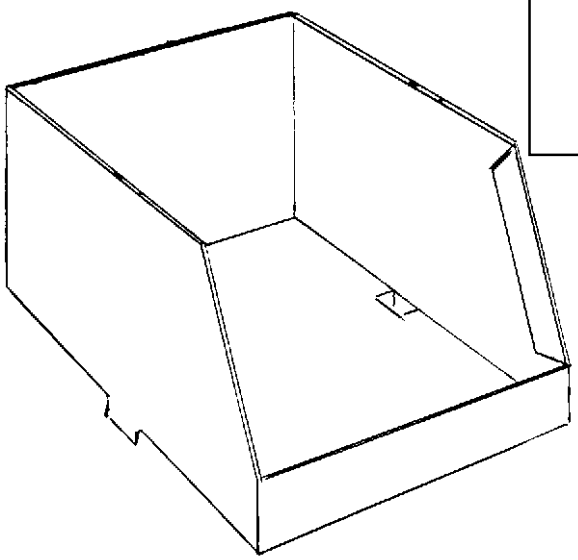
The header may be die-cut into any suitable configuration; the "tongue" has been formatted to fit the slit in the back panel of the corrugated display.

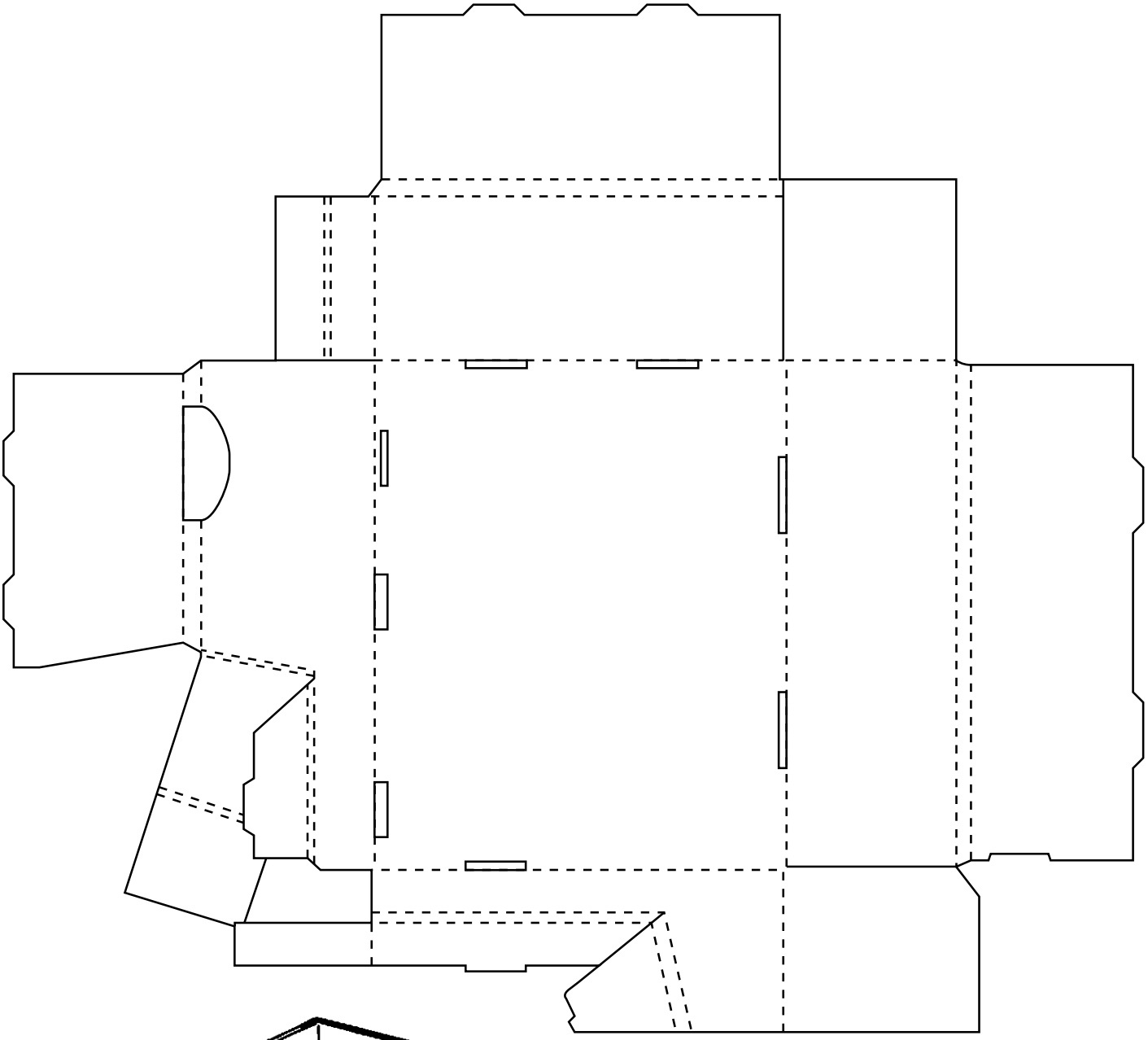
The insert helps the contents of the display lean back.

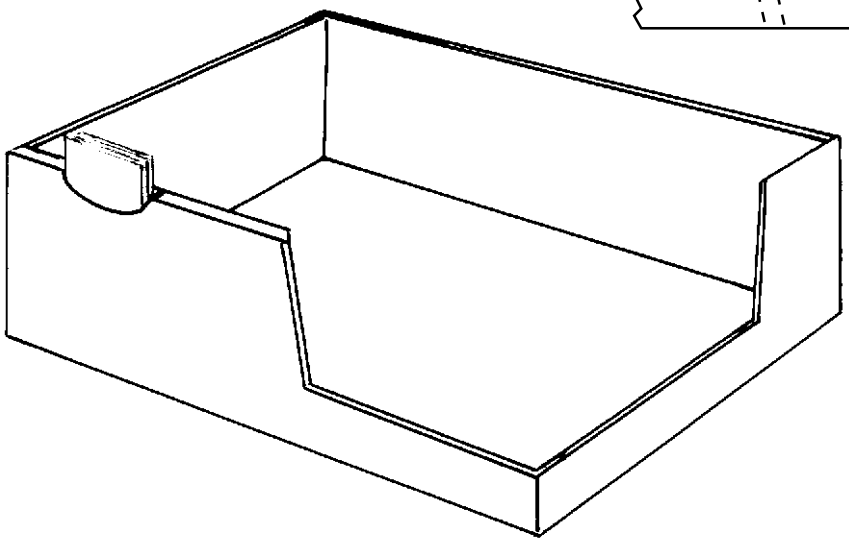


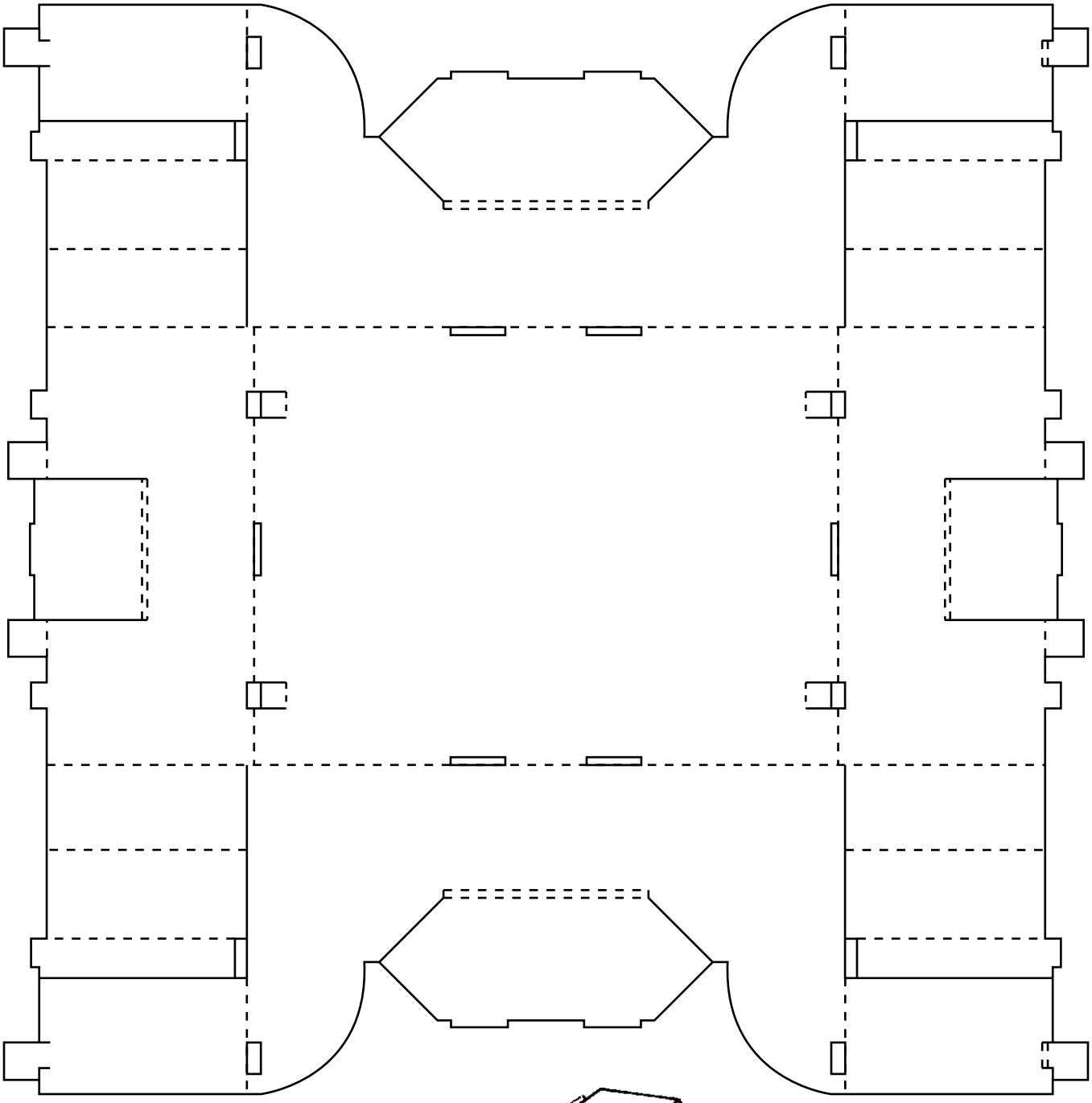
This double front, end, and side wall bin has bottom tabs and corresponding slots in the top to facilitate stacking.

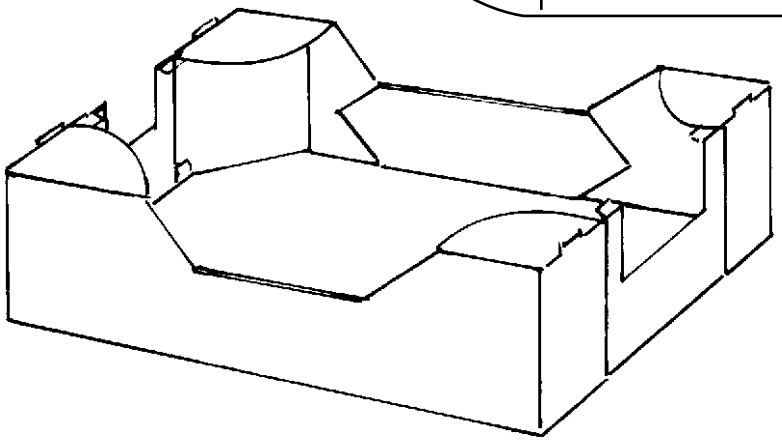




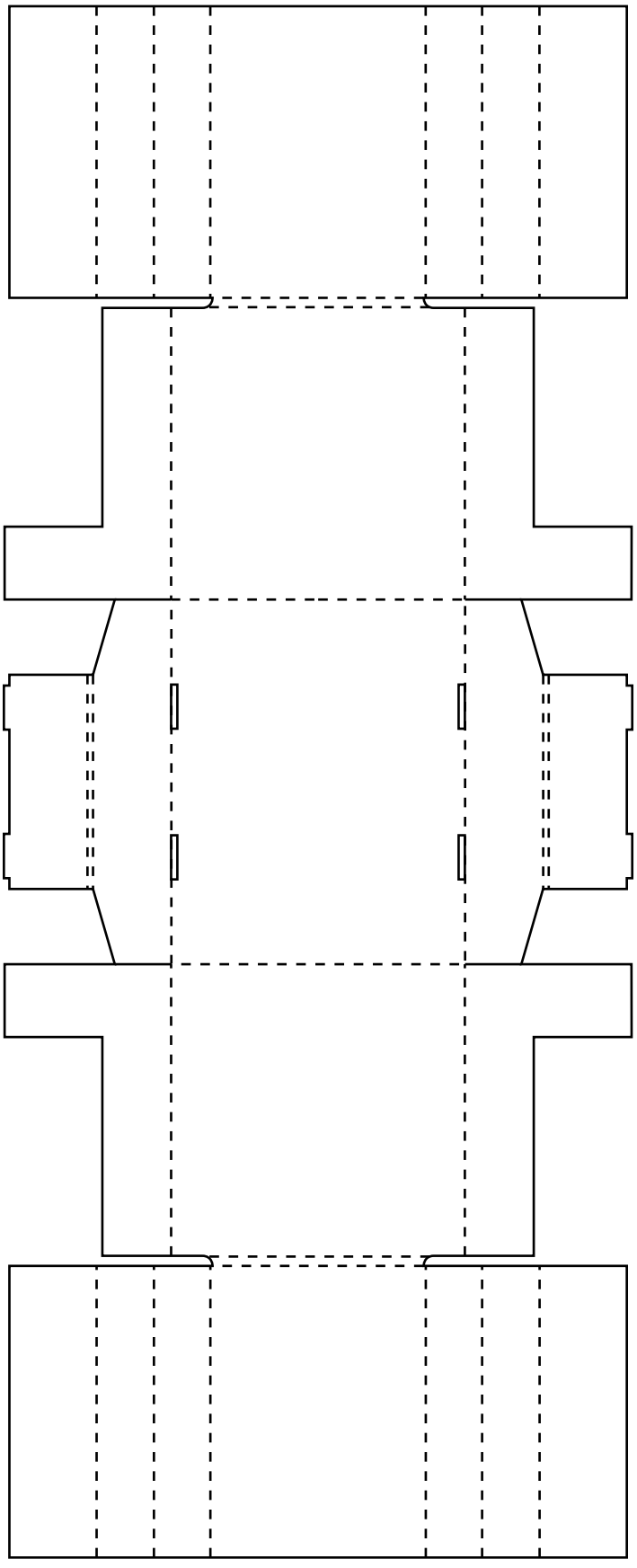




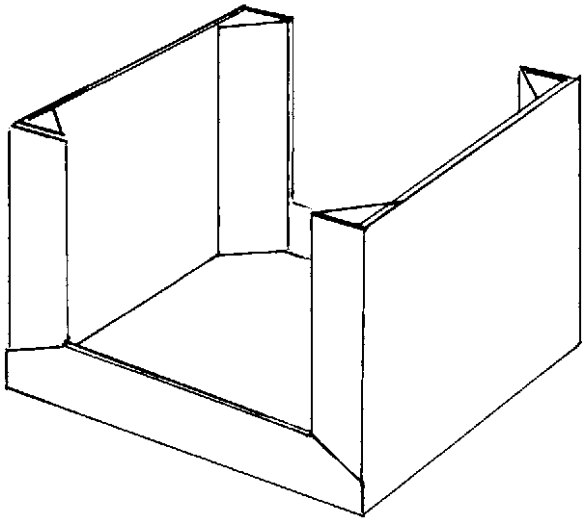


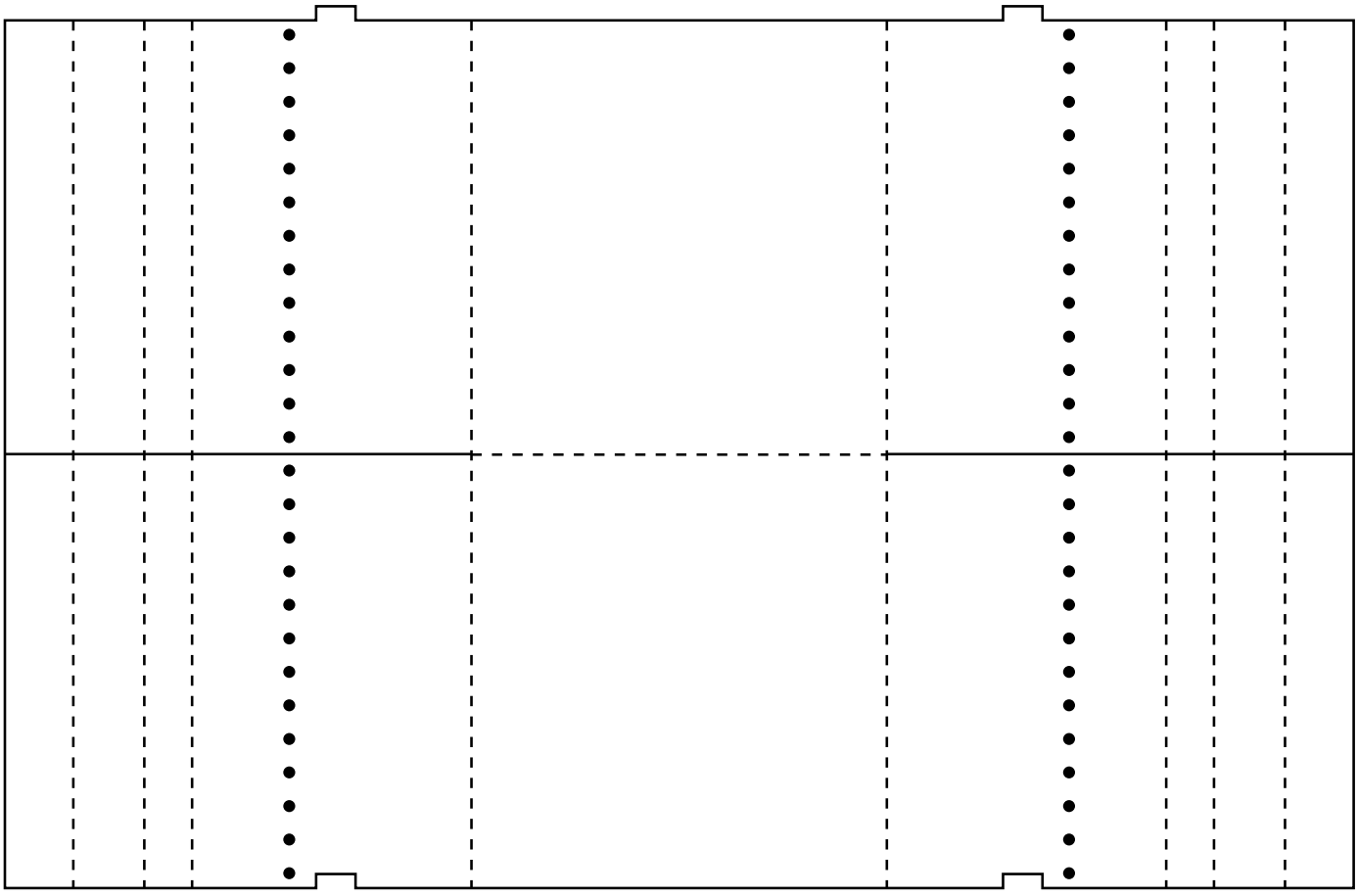


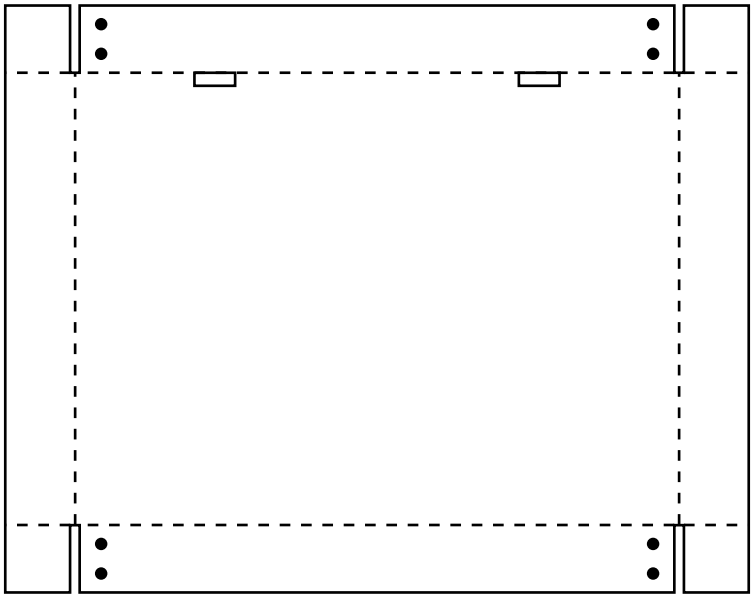
Double-walled display with reenforced corners and stacking tabs and receptacles

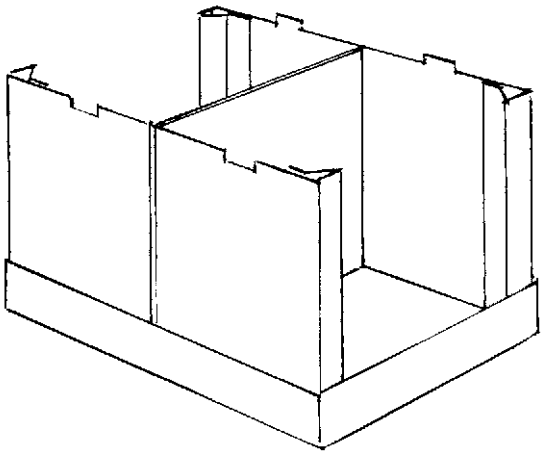


This carton has four reinforced corners to facilitate stacking of heavy products.

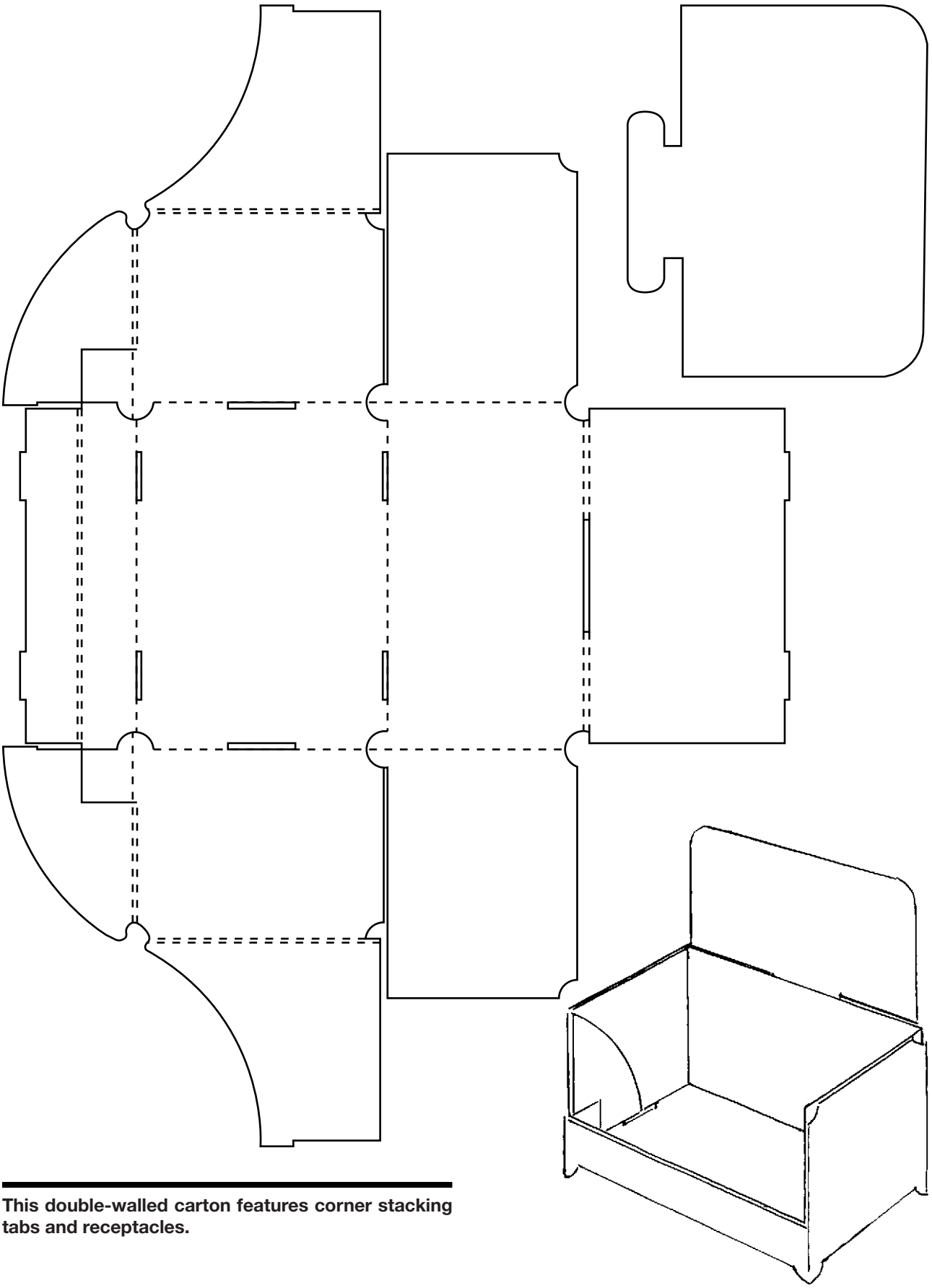






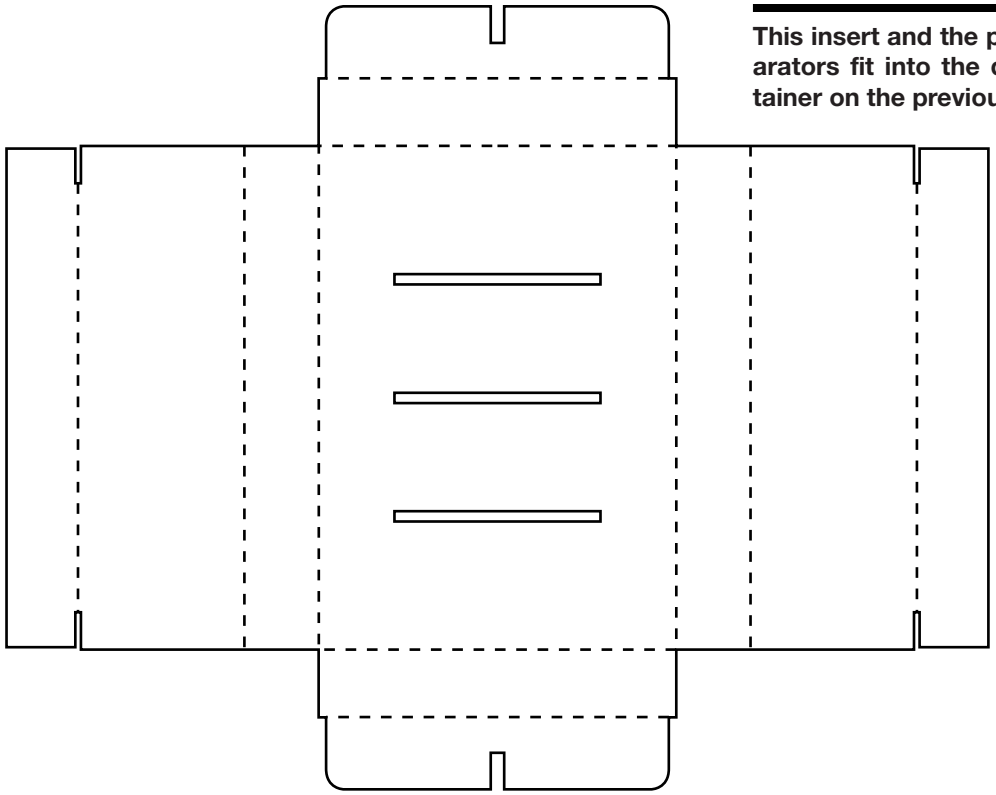


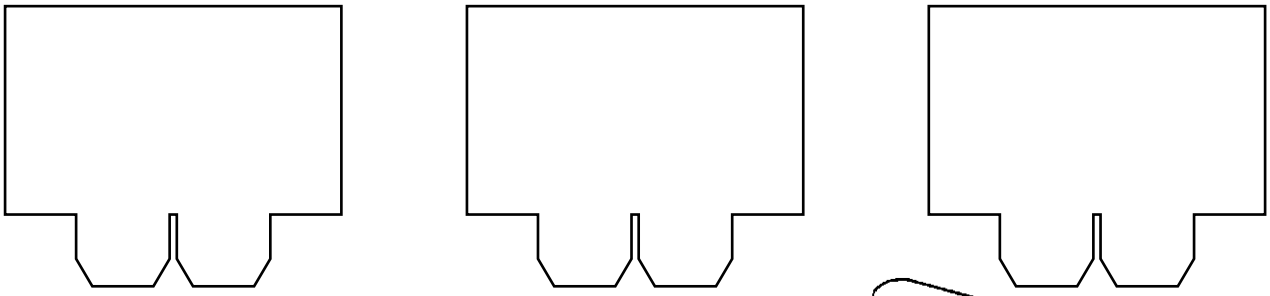
The insert divider facilitates stacking.

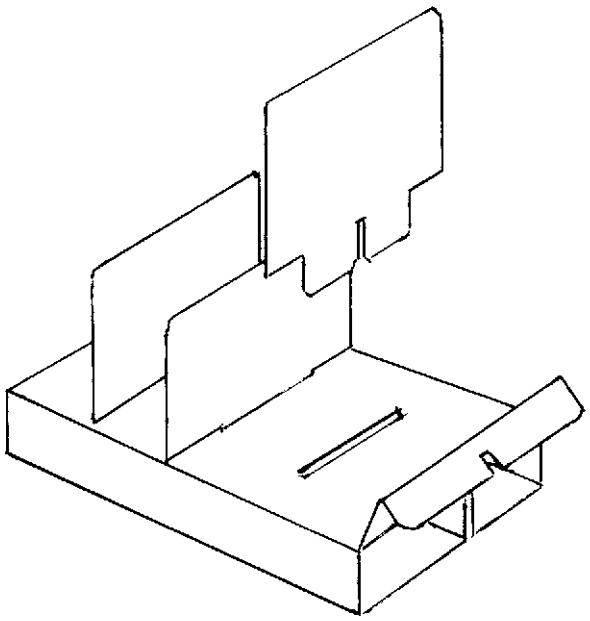


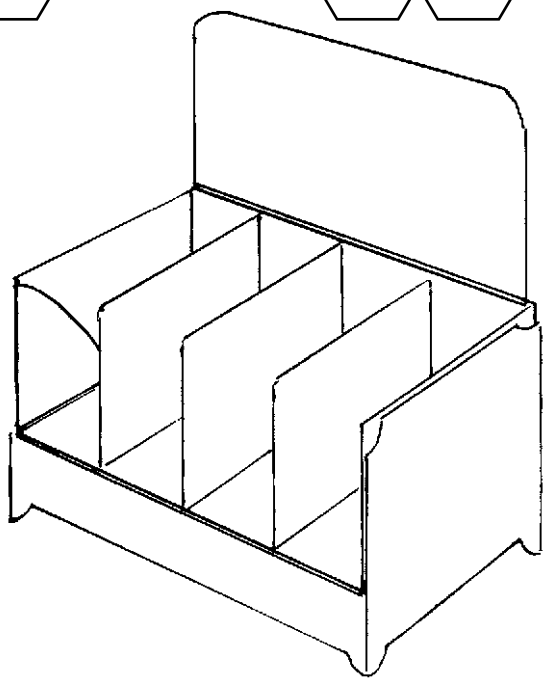
This double-walled carton features corner stacking tabs and receptacles.

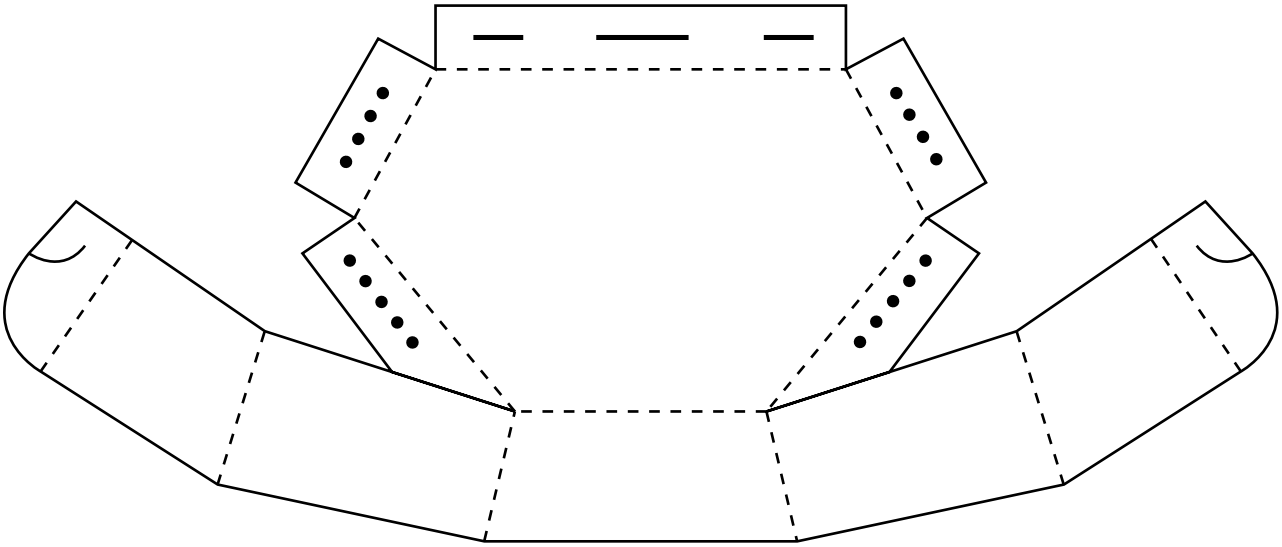
This insert and the product separators fit into the display container on the previous page.

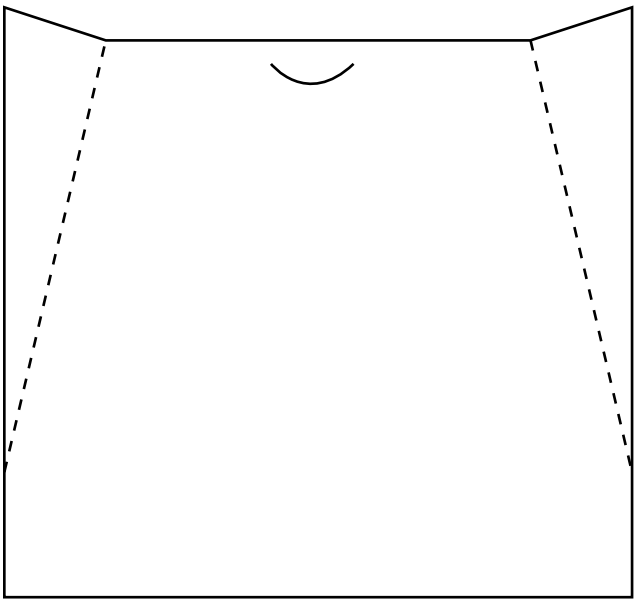


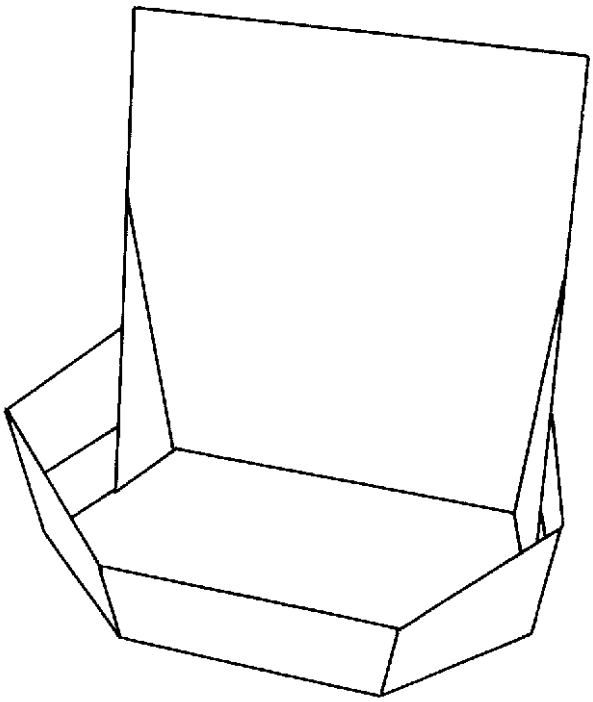




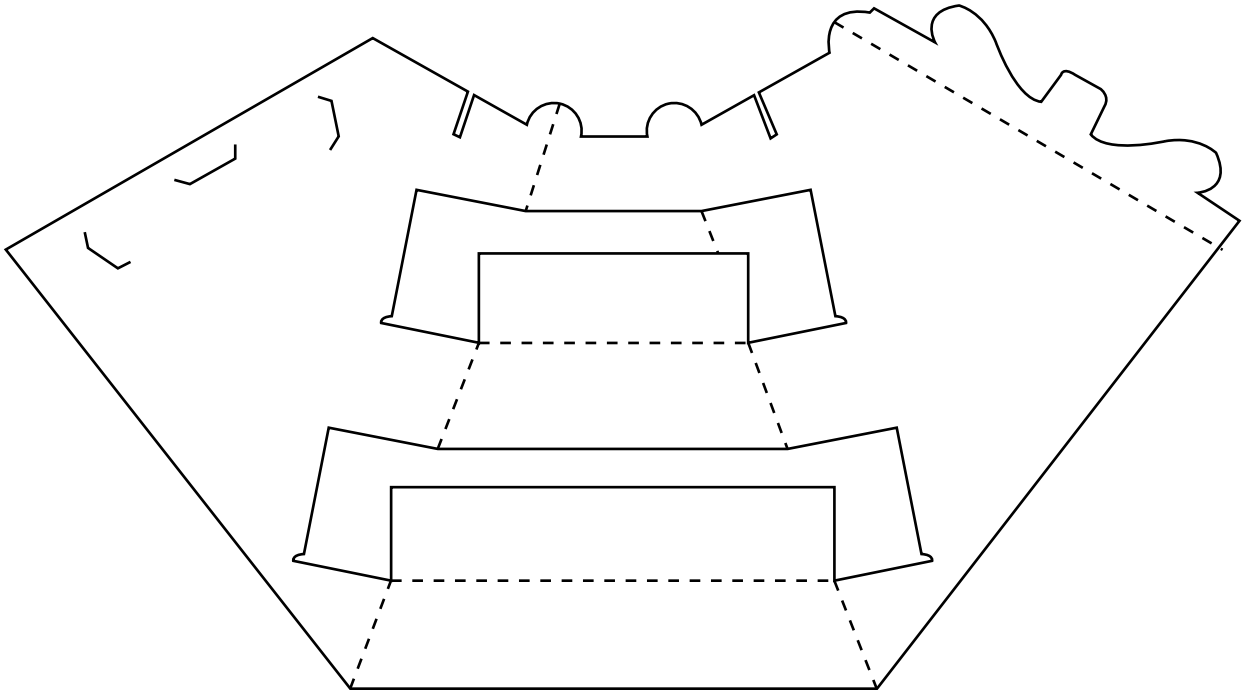


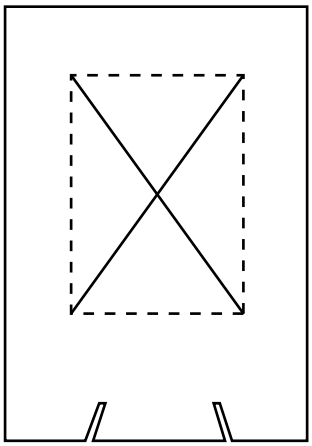


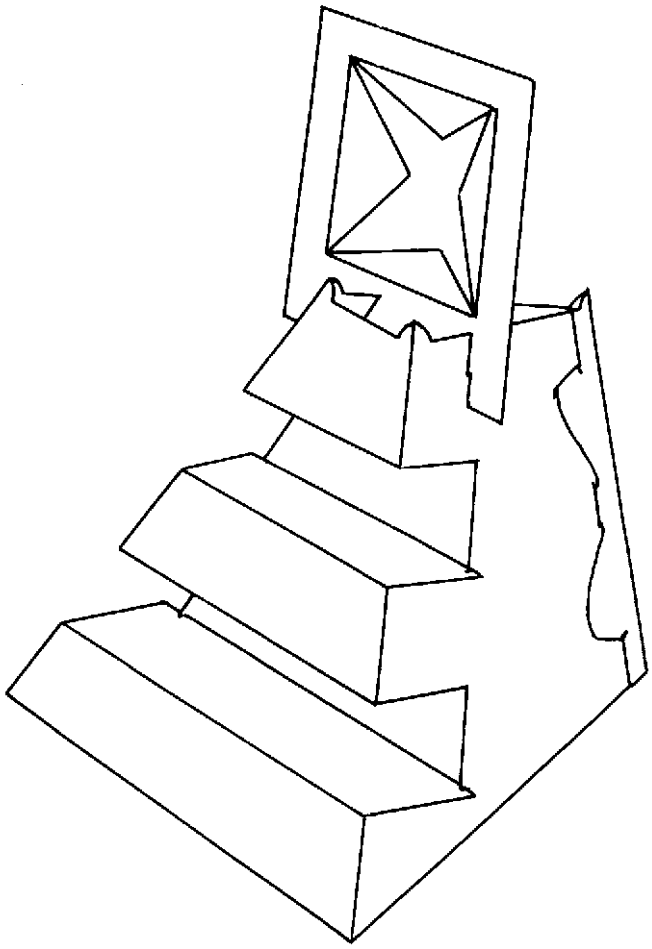


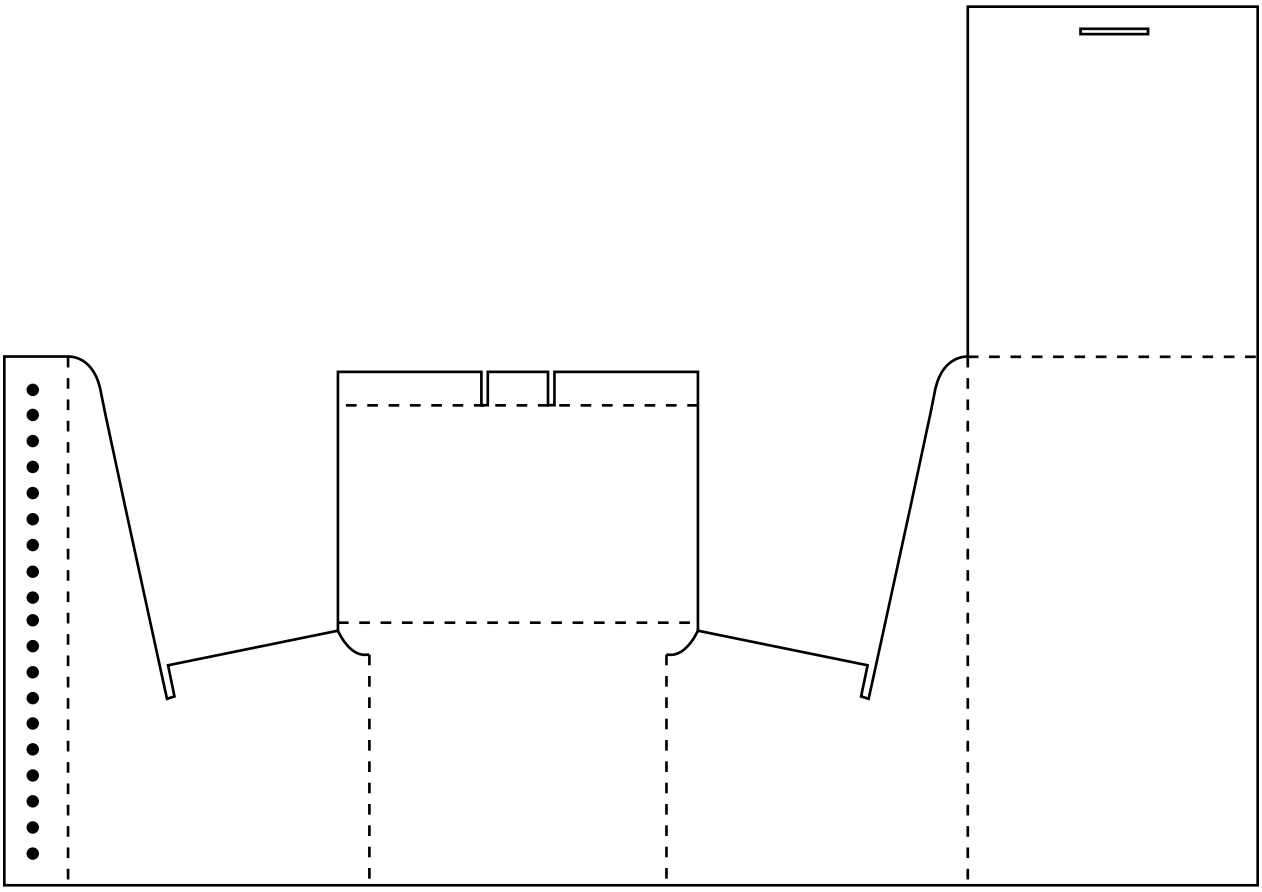


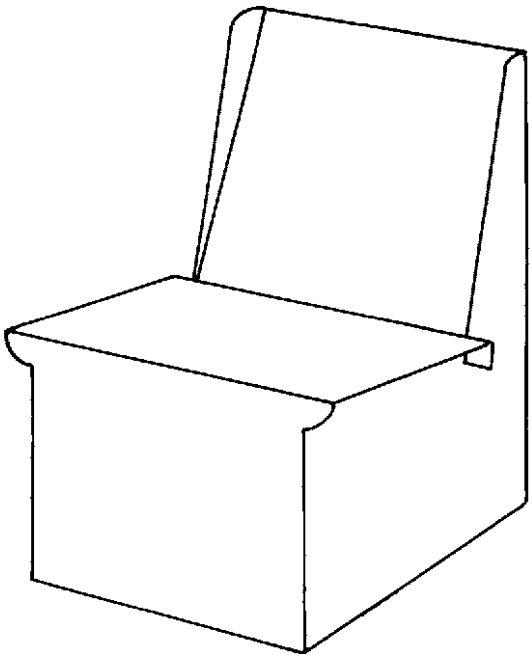
Ideal for a "dump" style of display. A base may be added to make this a floor display.

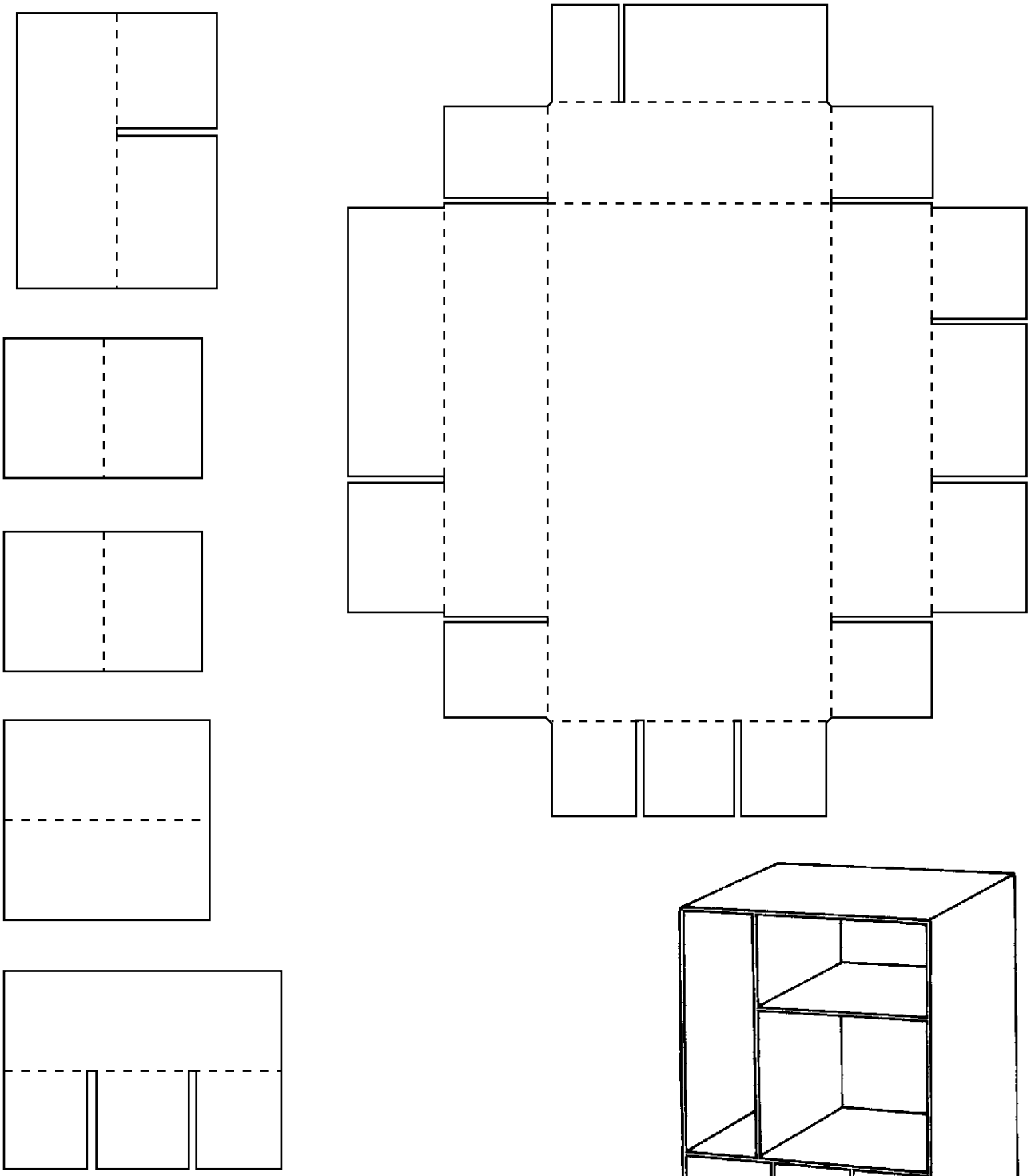




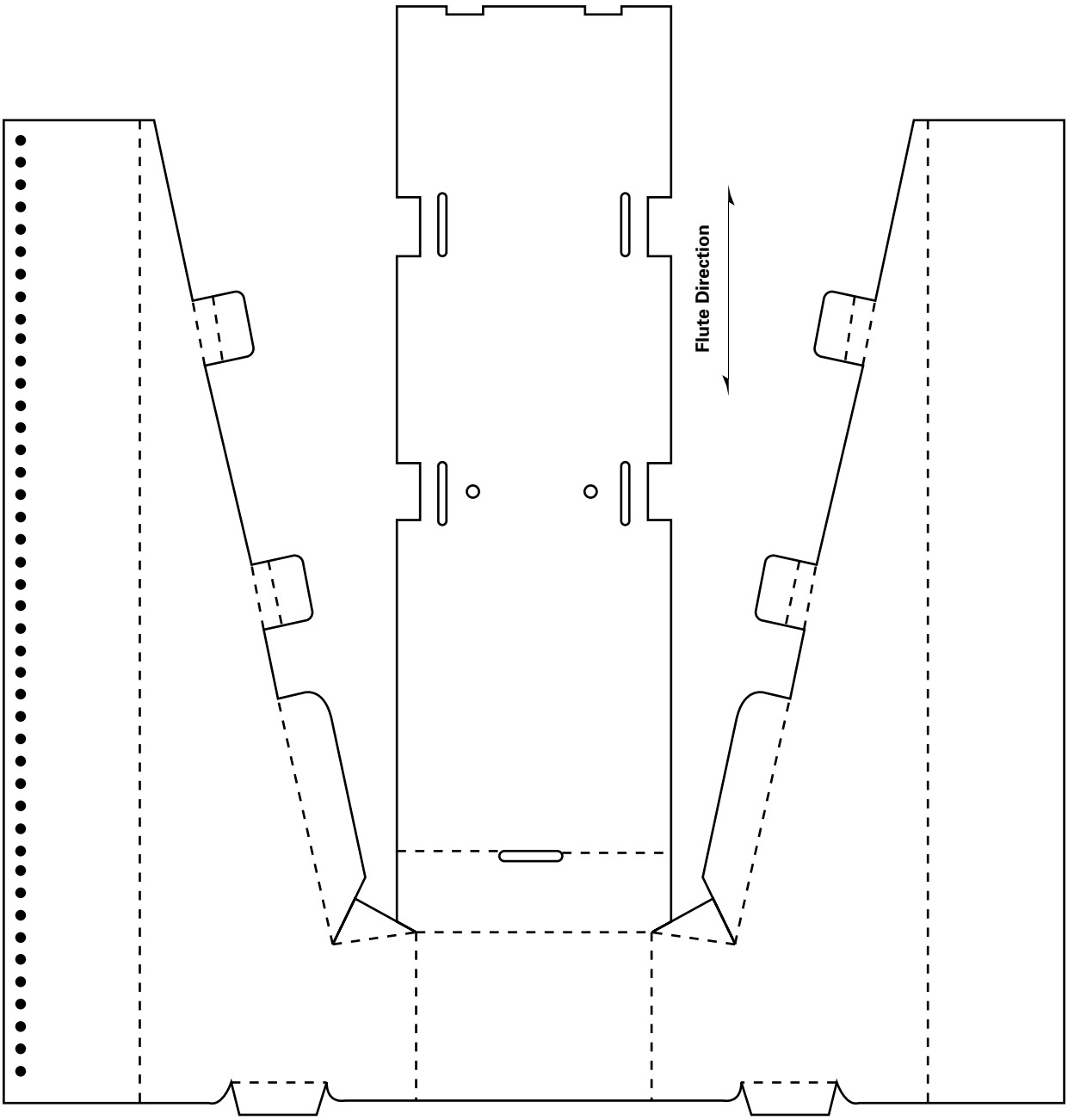




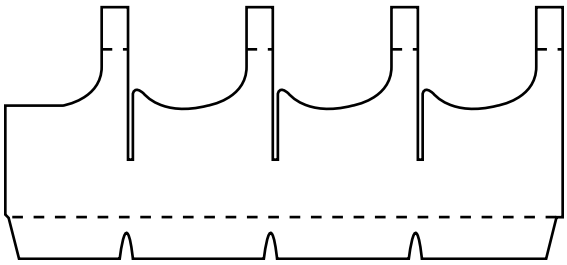




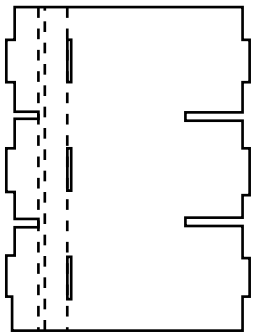
One of the many kinds of display partitions that can be built using corrugated board. It can be free-standing or supported by the display stand on previous page.



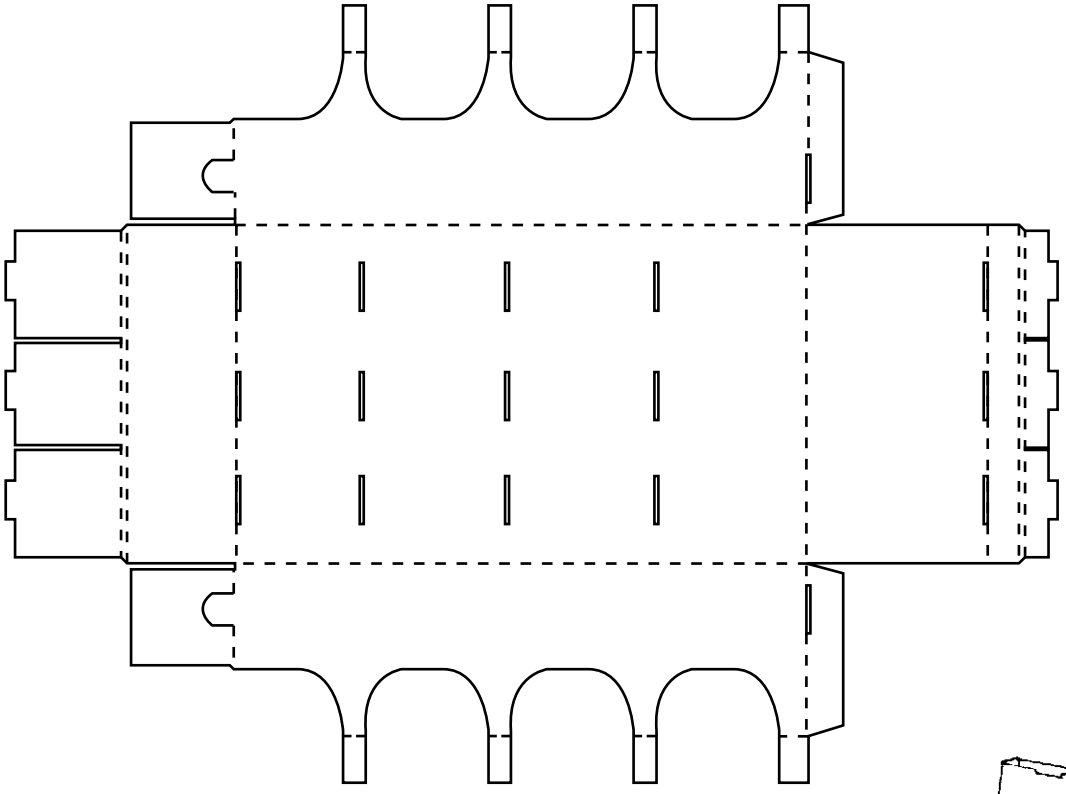
This 50" tall display base may be scored vertically in the center of both side panels and horizontally across all panels for easier shipping and storing. (See Scotti Easel, page 600.)



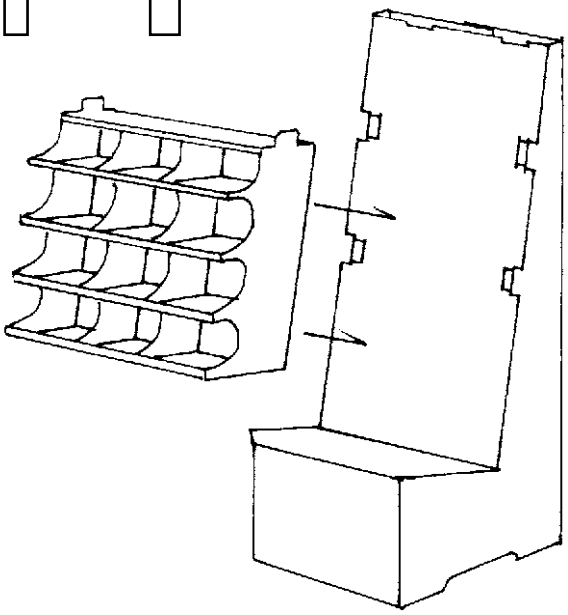
Two panels

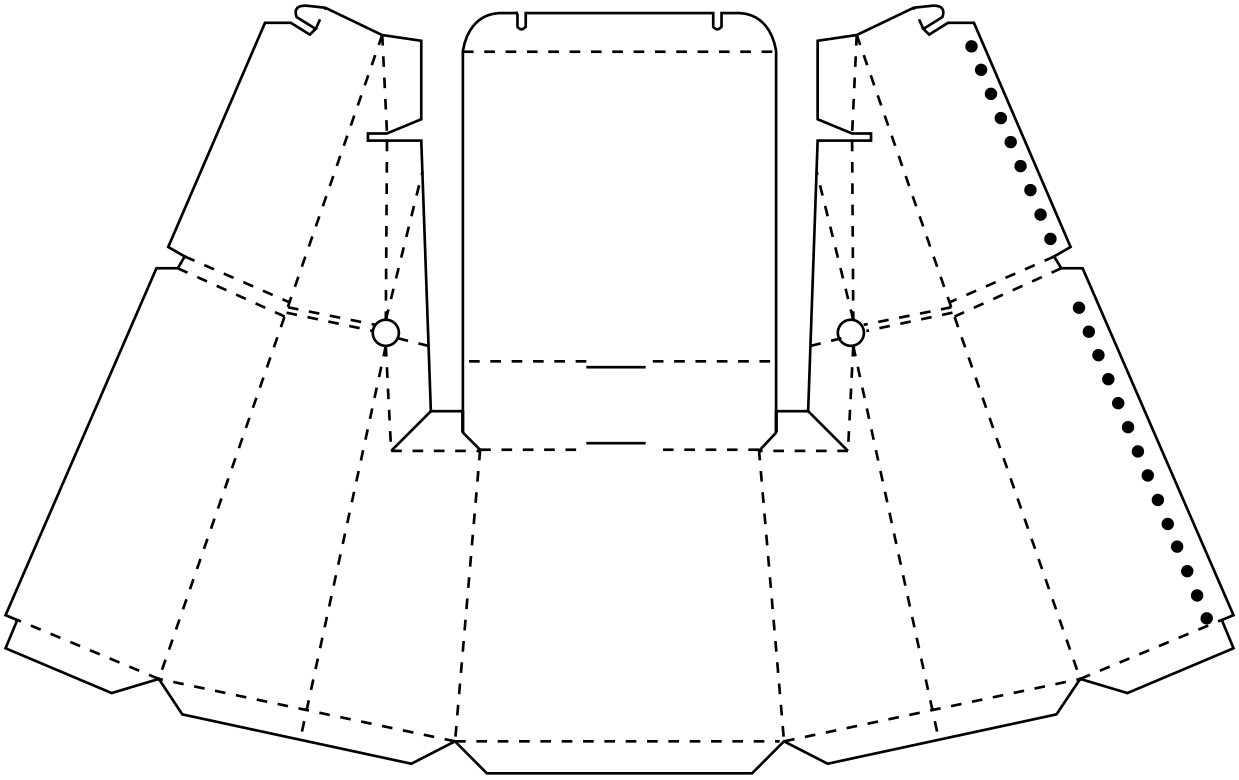


Three shelves

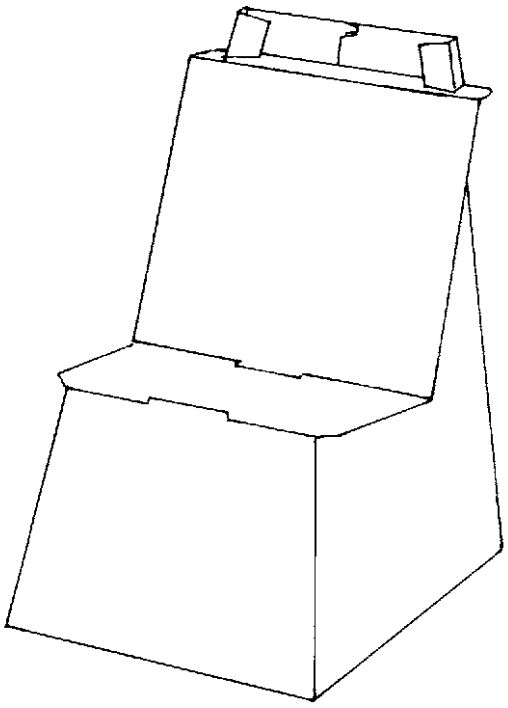


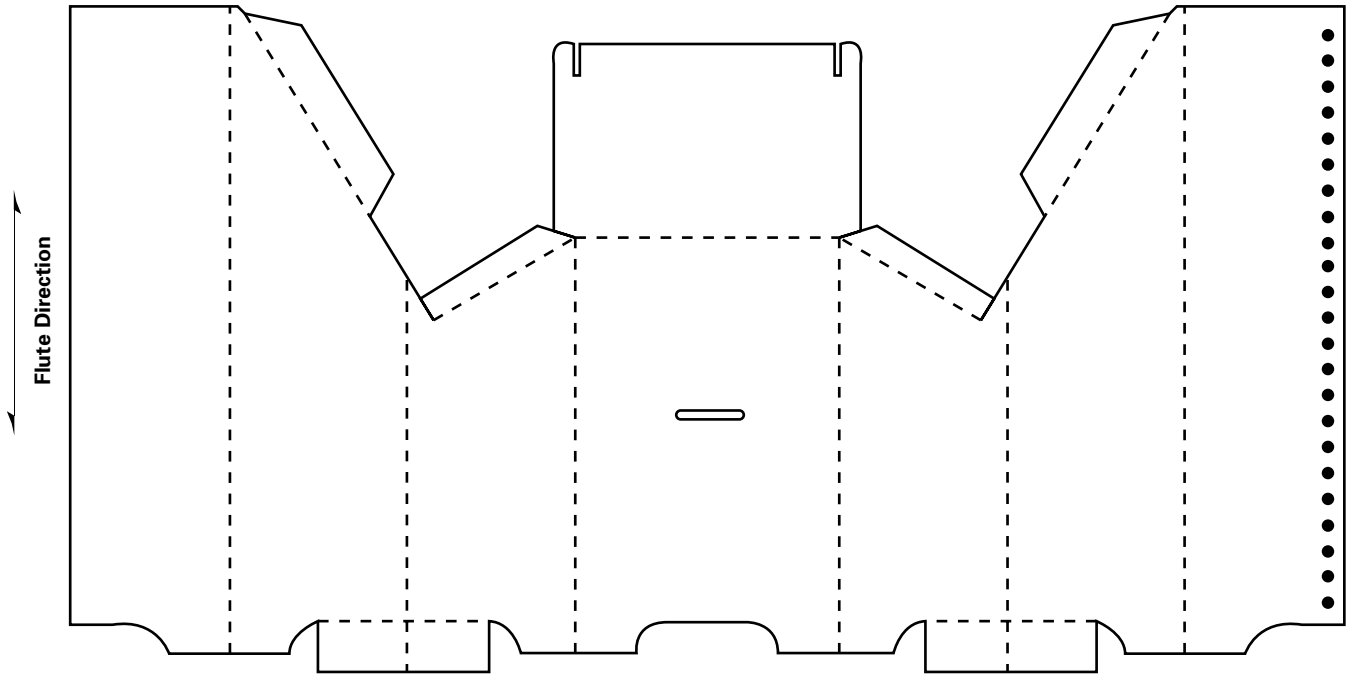
Two of these units fit on the display base pattern on the preceding page. The protruding ears on top of the unit fit into the base of the top bin.



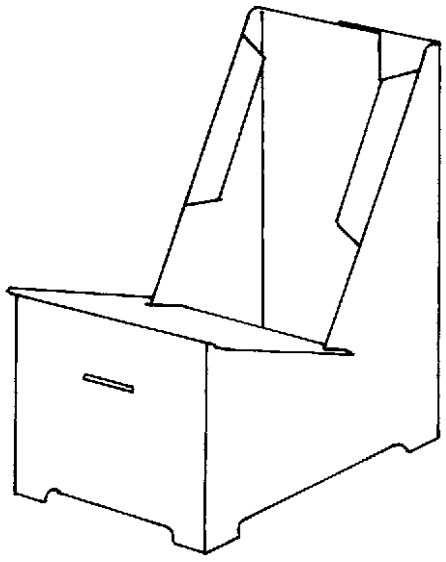


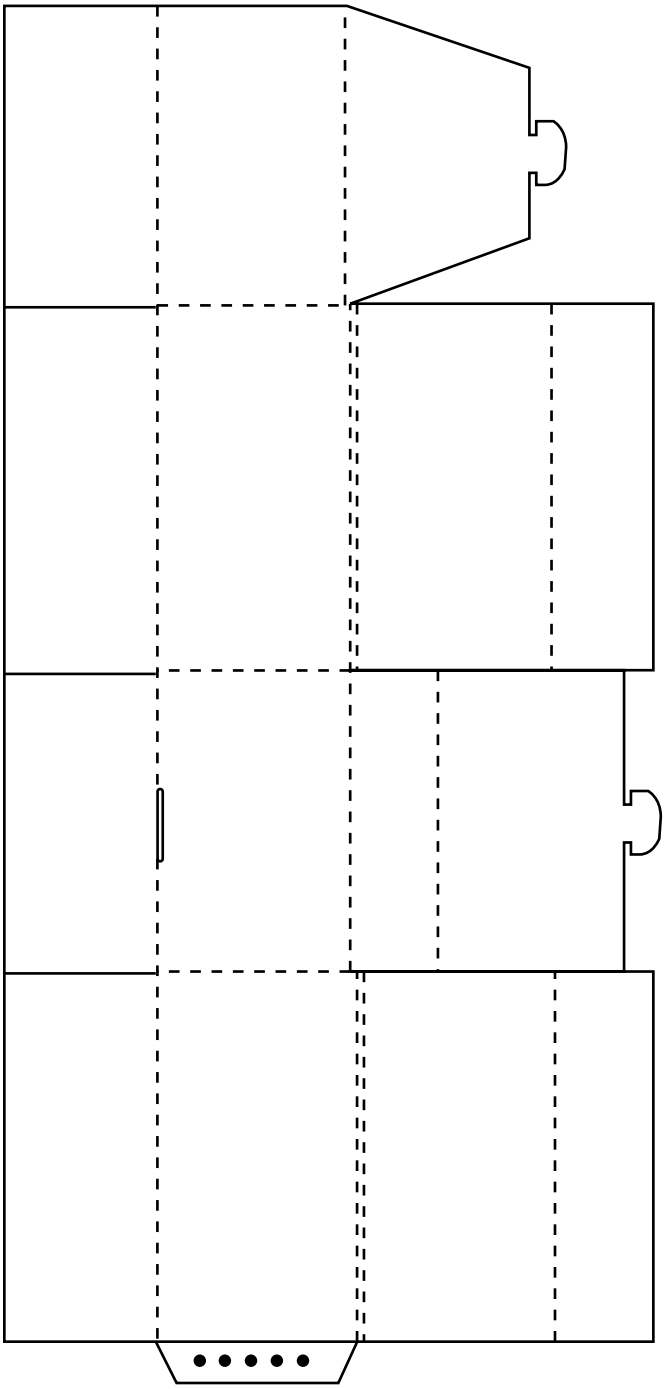
Corrugated trapezoidal display base. The lateral score lines in the side and back panels indicate the *breakdown score,* which allows the base to be folded in half for shipping.

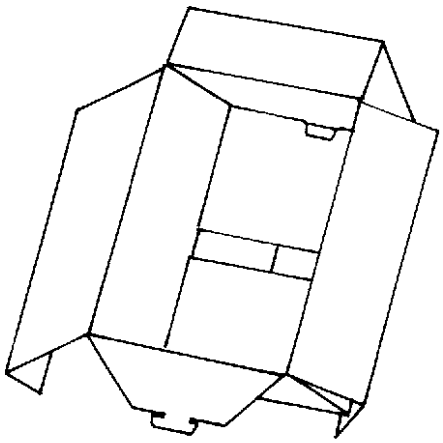




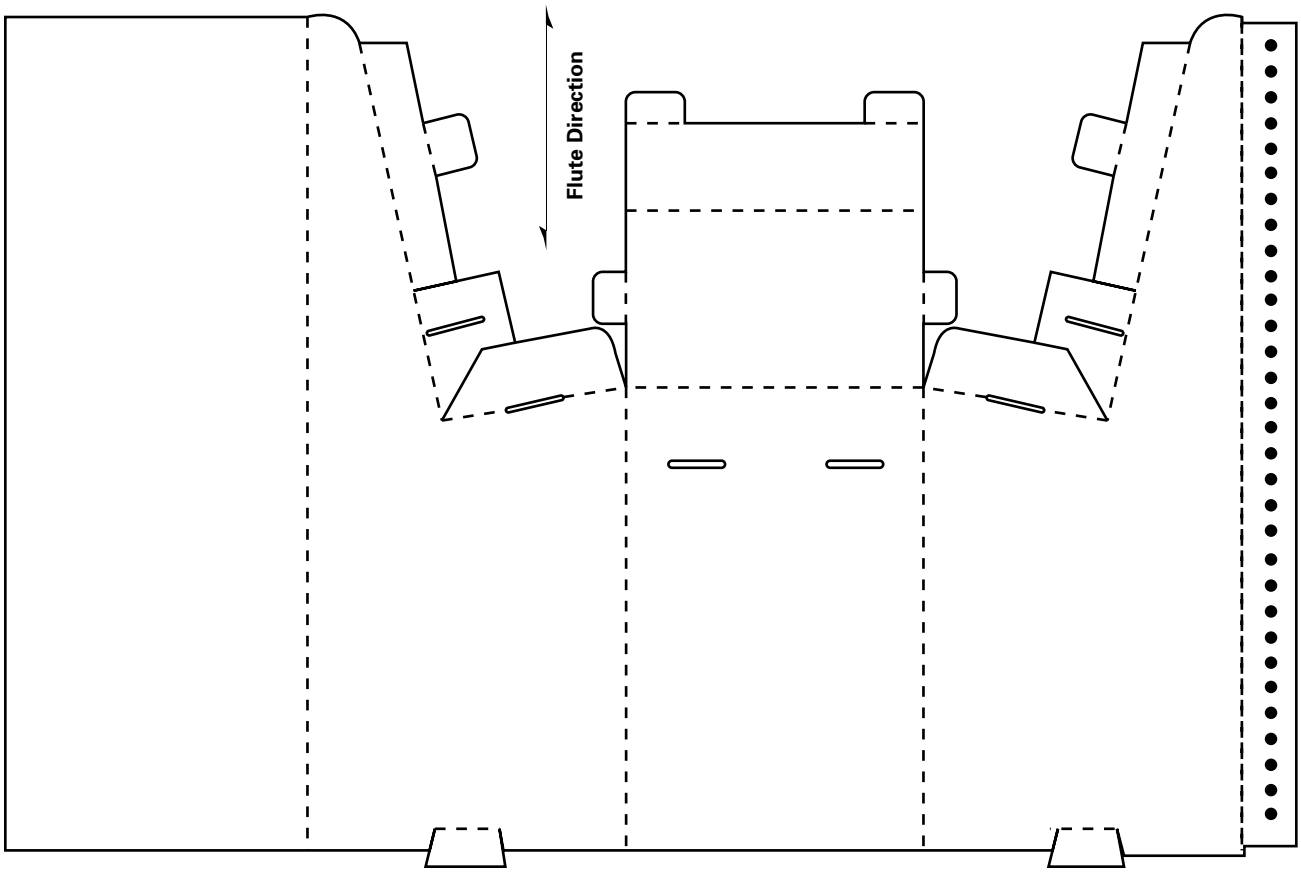
The slot in the bottom front panel mates with the tongue on the inside-out shipper on the following page.



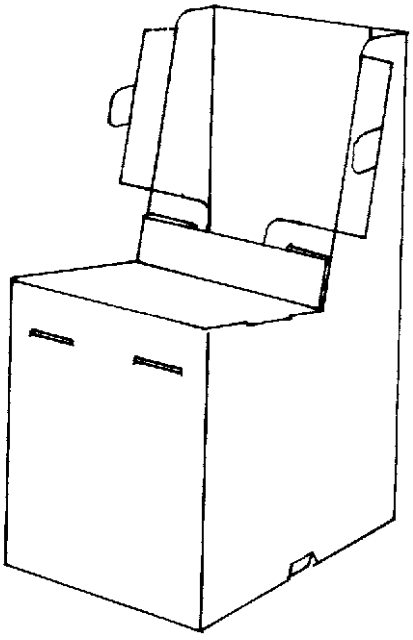


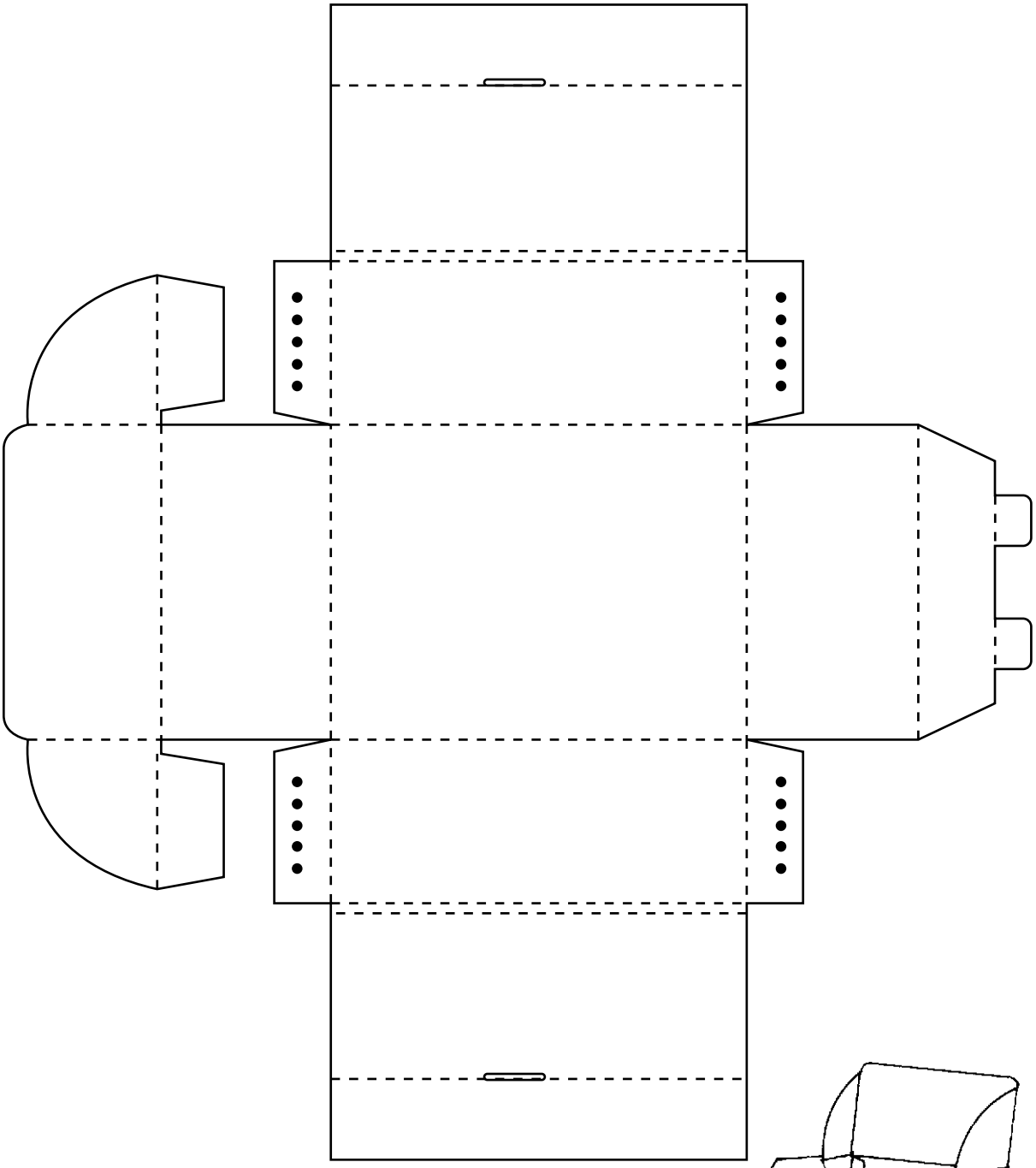


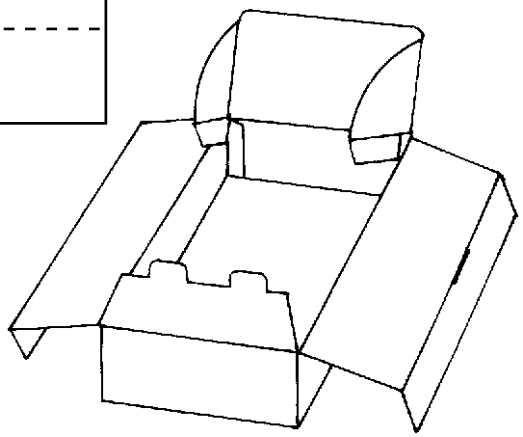
The shipping container has the graphics on the inside panels. The bottom is taped; top panels are folded back and the riser panel is kept in place by the tongue and slot combination.



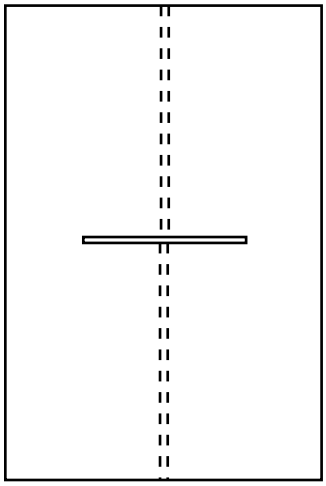
The ears on the front panel lock into the slots on the side panels. The slots in the front panel and ears on the side panels match up with the inside-out shipper/ display container on the following page.

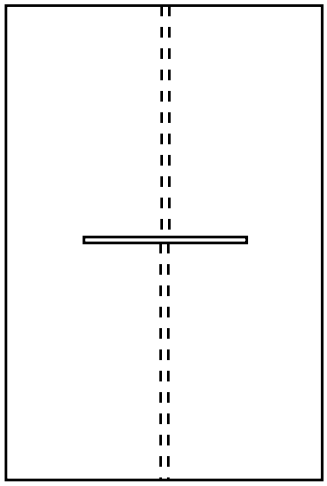


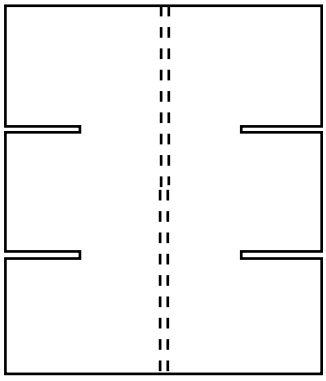




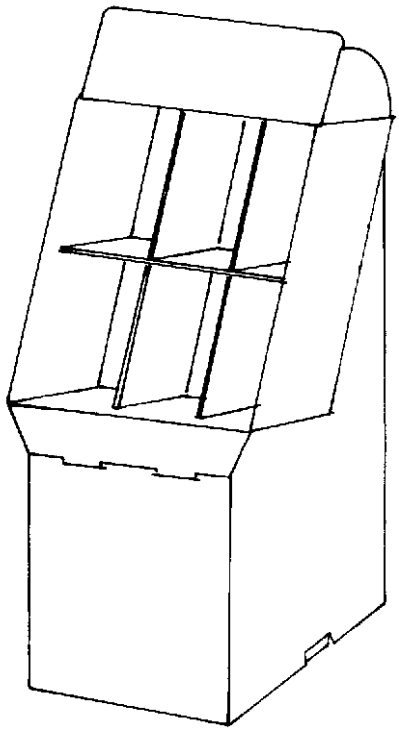
The printed inside of this container unfolds into a display tray at point of sale. The riser panel's tabs fit between the side panels and the cover flaps that are folded back. The slots and ears mate with the ears and slots of the base on the previous page.

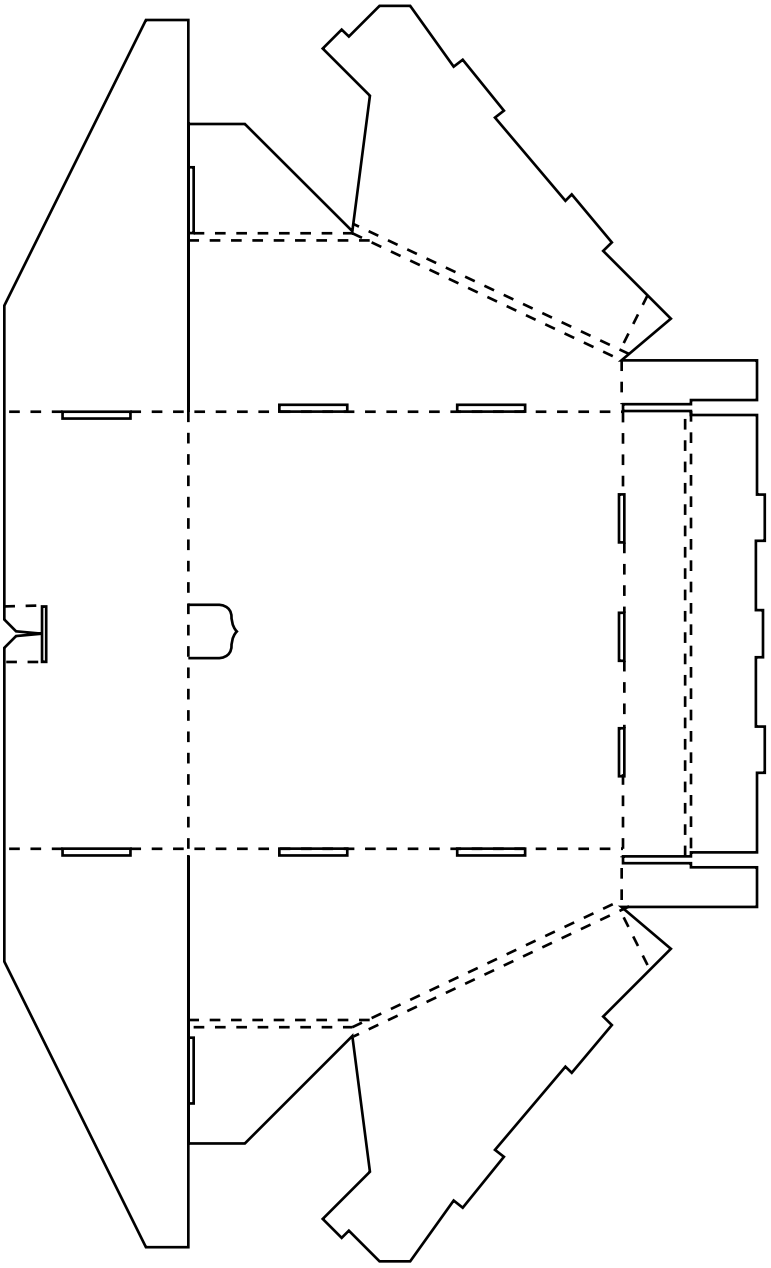


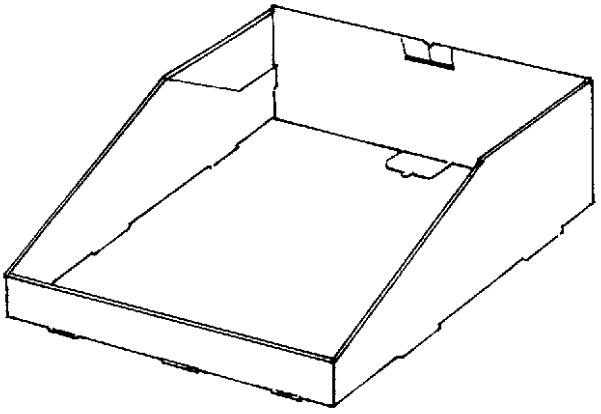




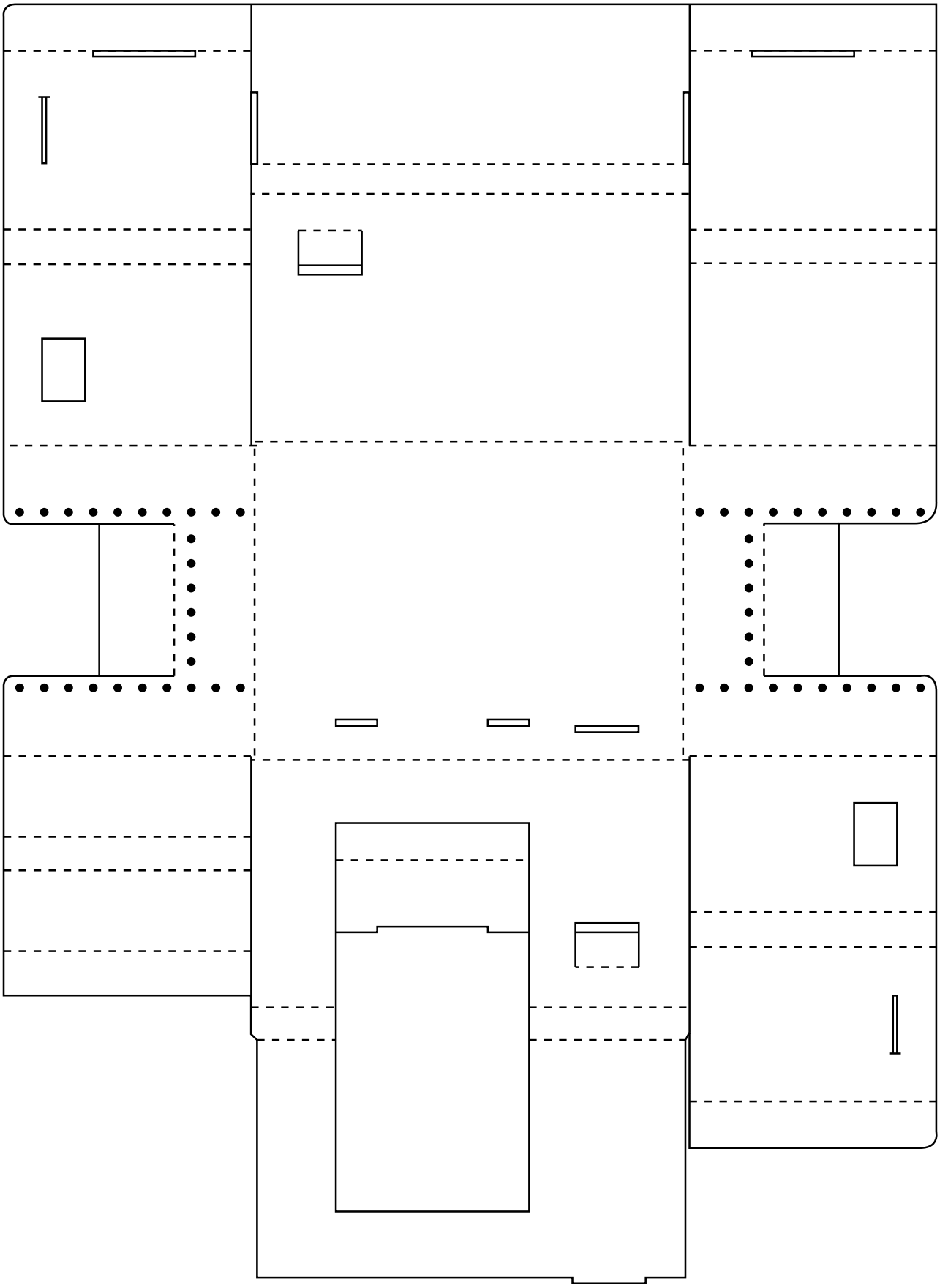
Display containers can be divided into sections fitted to the product(s) to be displayed. The corrugated dividers shown here are slotted, folded, and slide together to form six equal partitions.

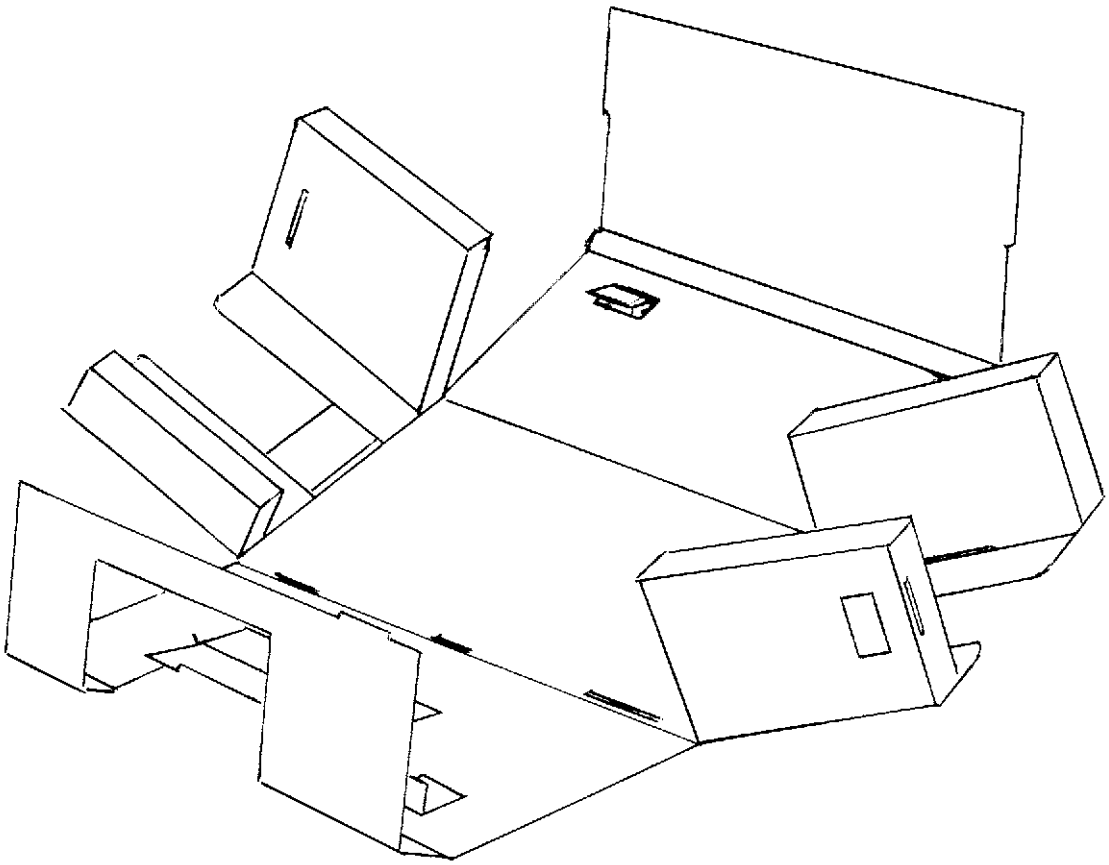


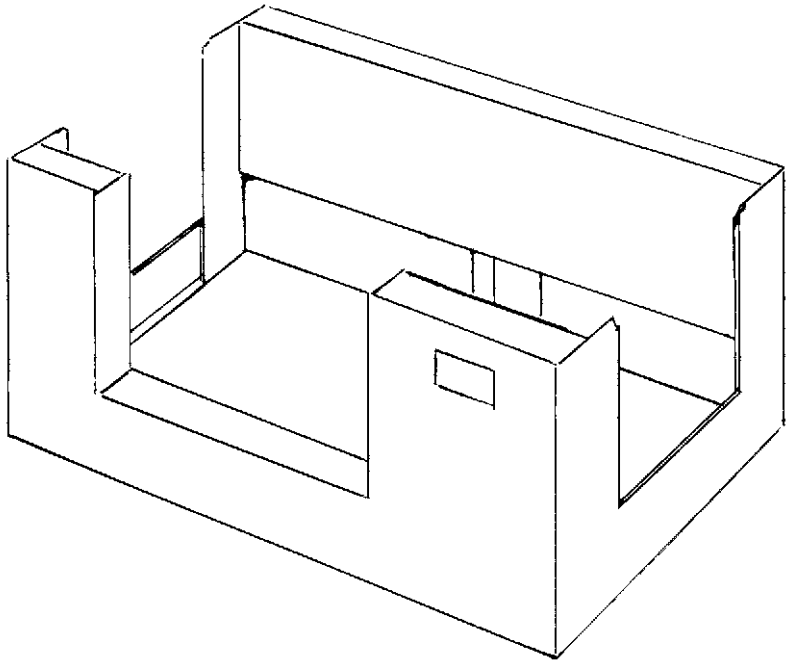


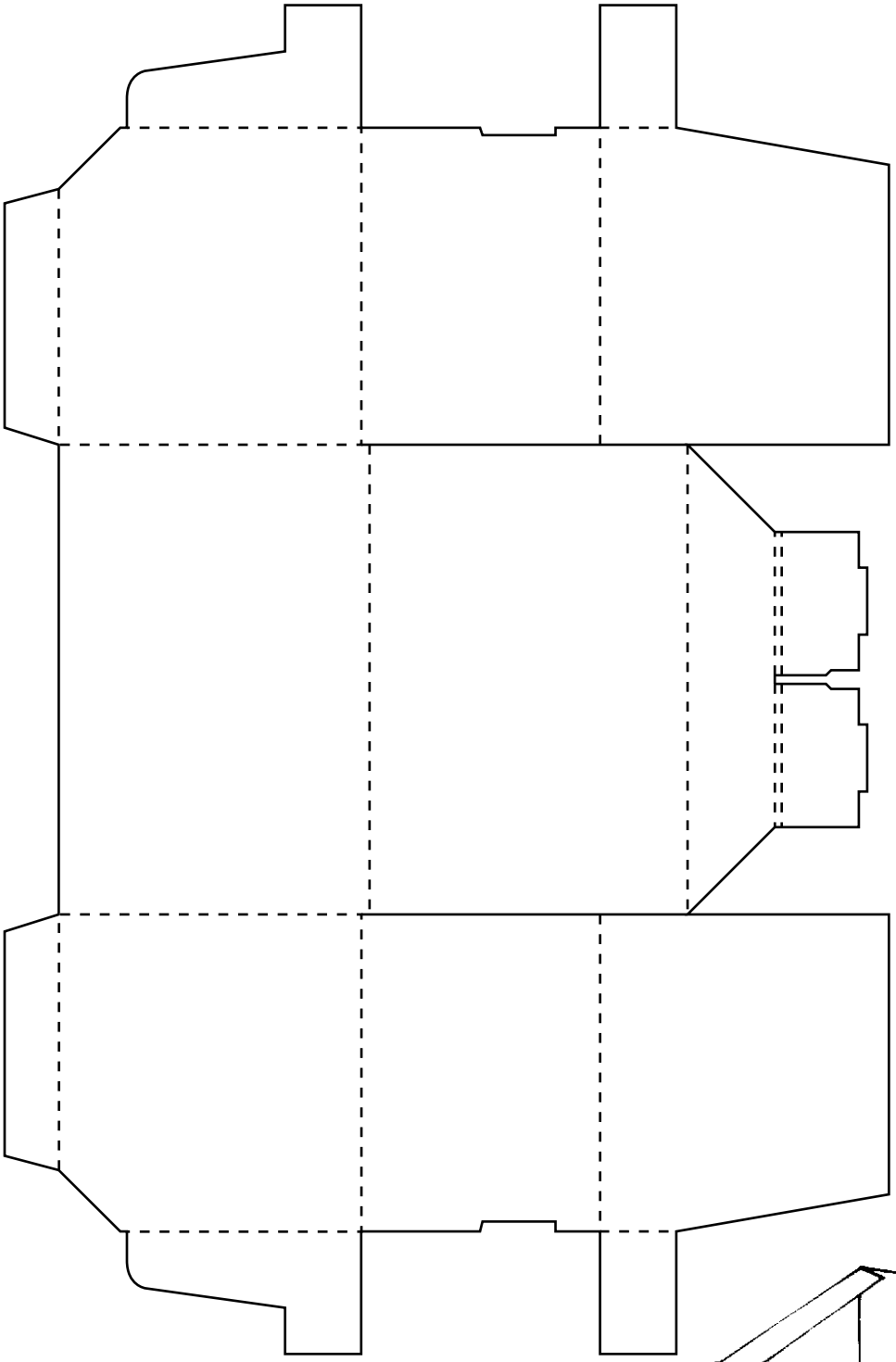


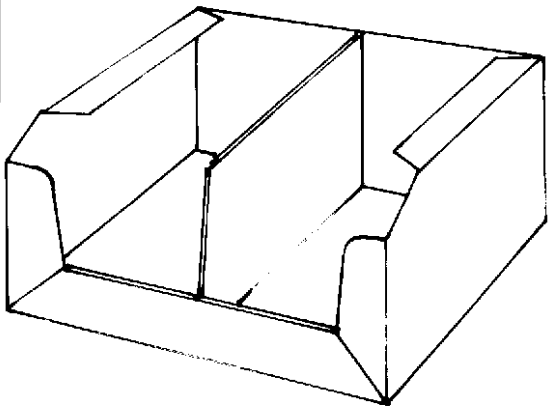
This corrugated tray with double front and side walls can be used as a counter display or as one level of the "waterfall" display shown on the following page.

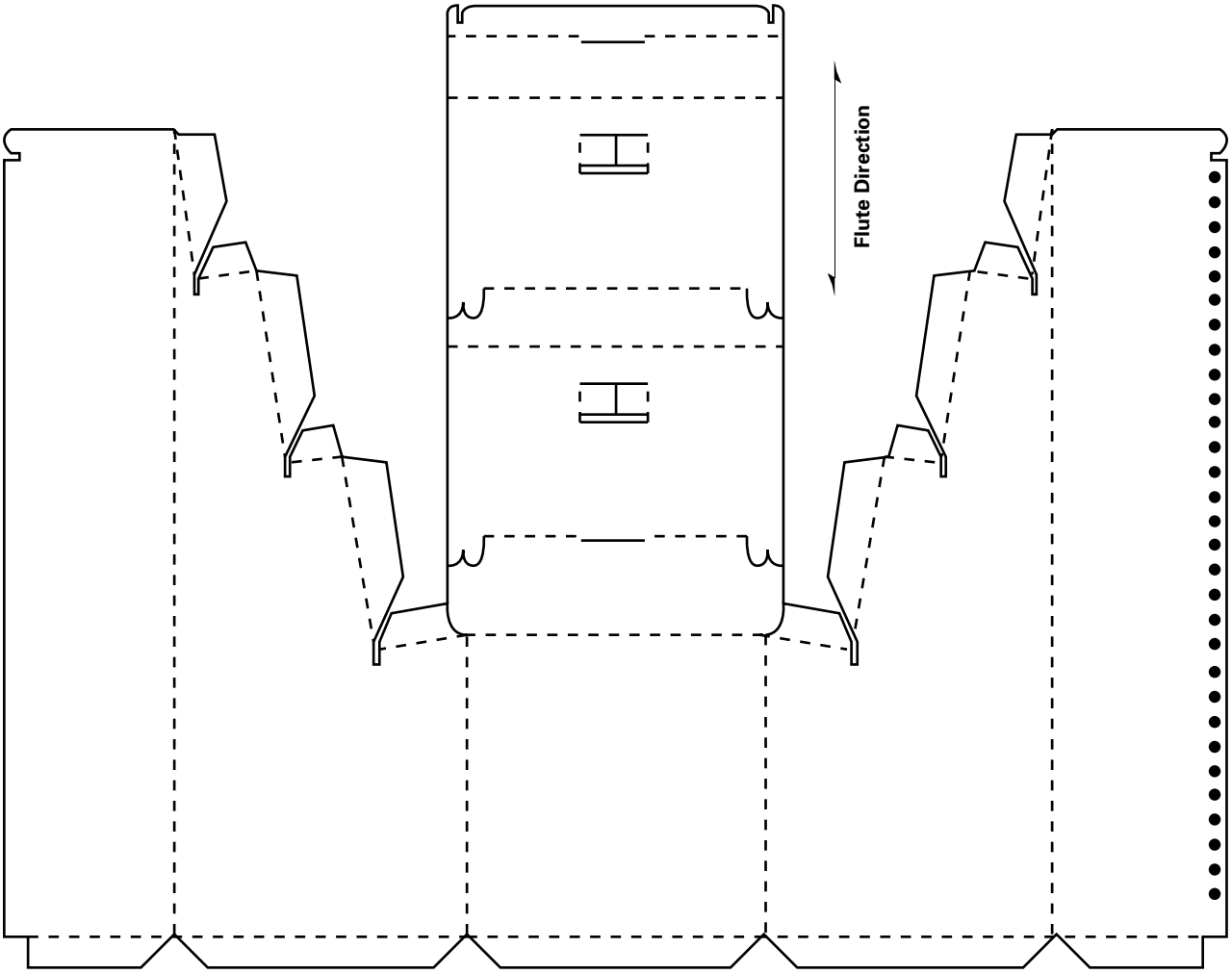


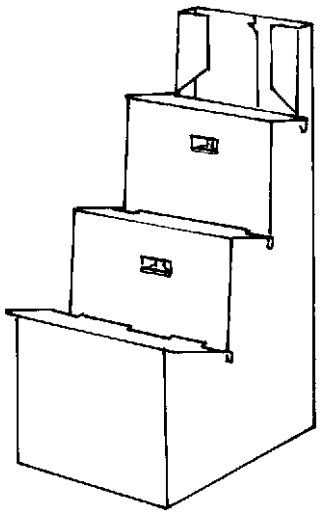




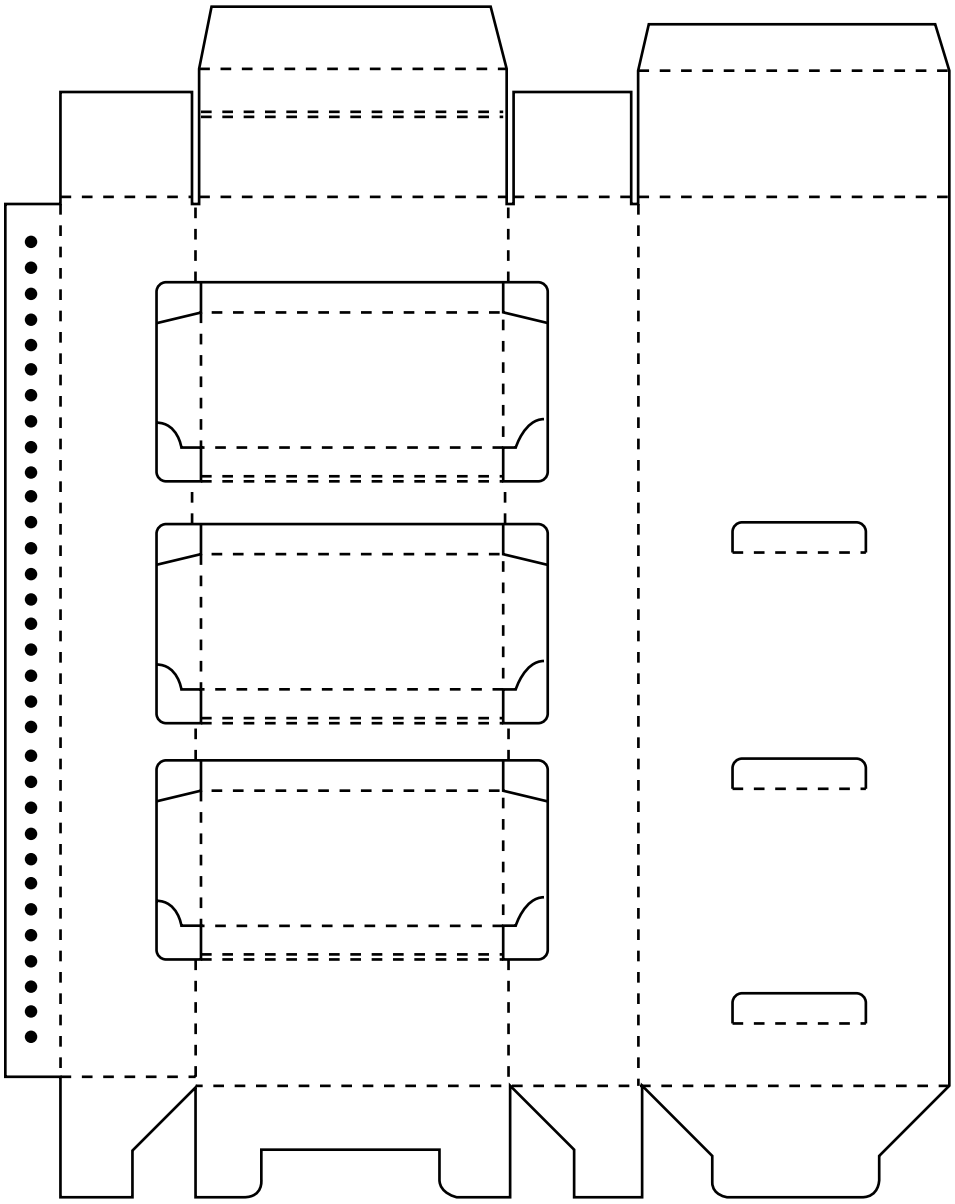




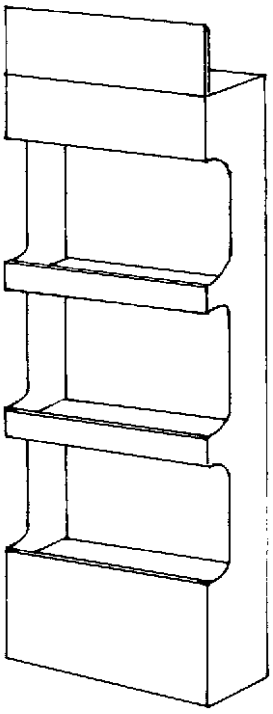




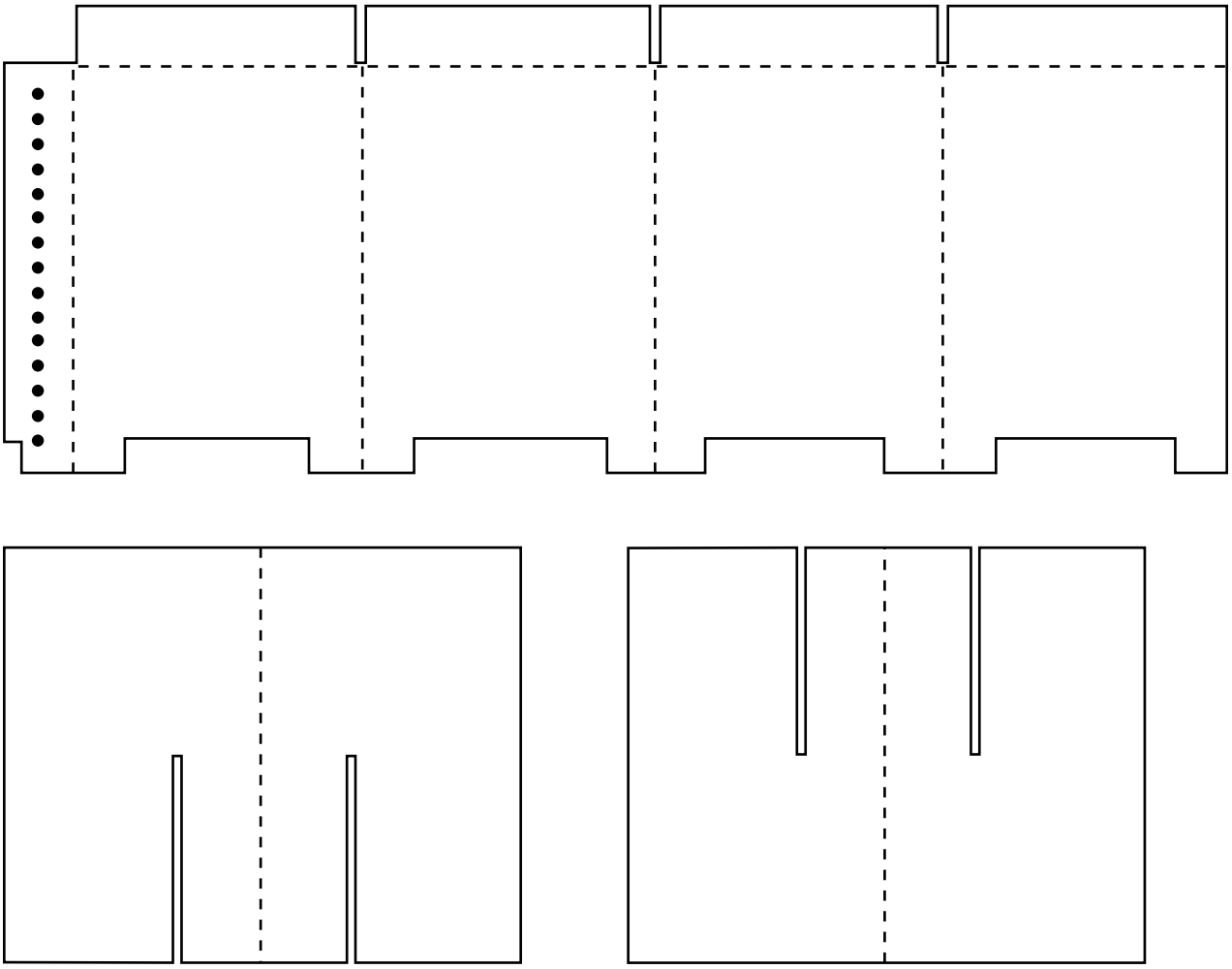
The 3-step waterfall corrugated display stand is ideal for showing one or more products on different levels.



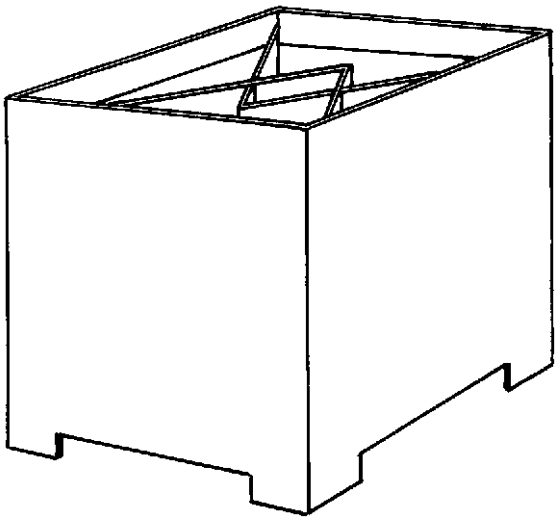
Flute Direction

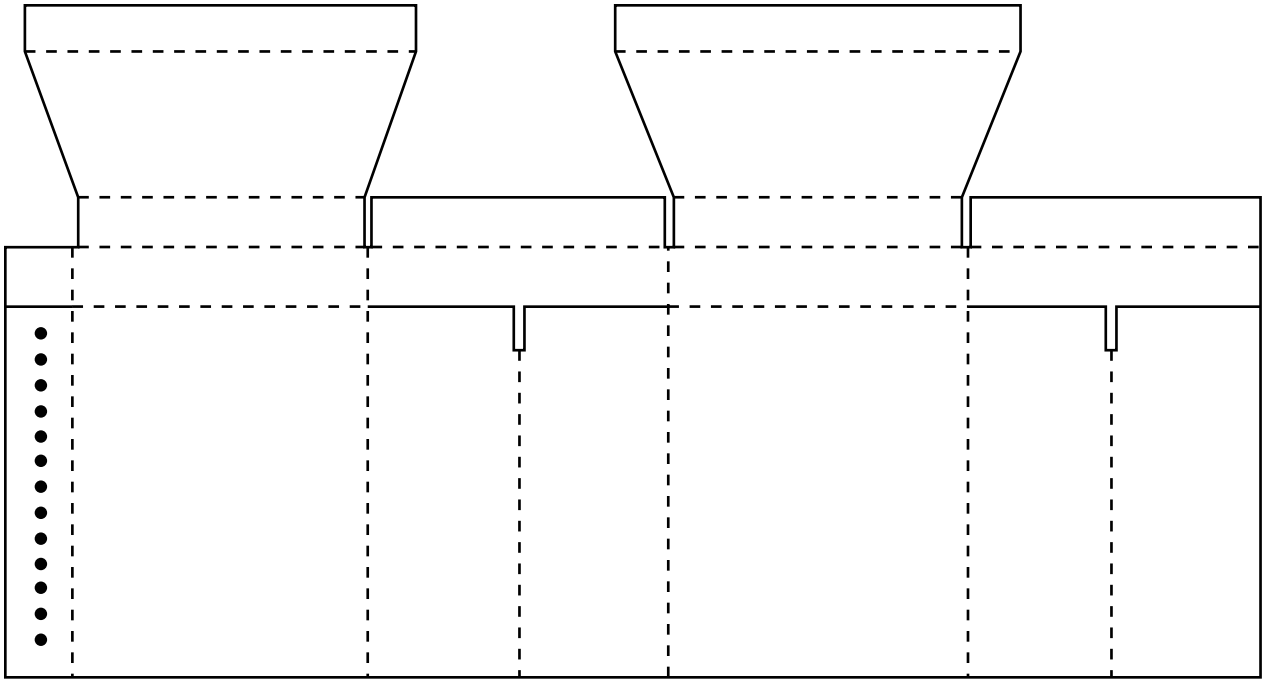


This pattern is but one of many configuration possibilities. The top closure panel may be folded upon itself to add header space.

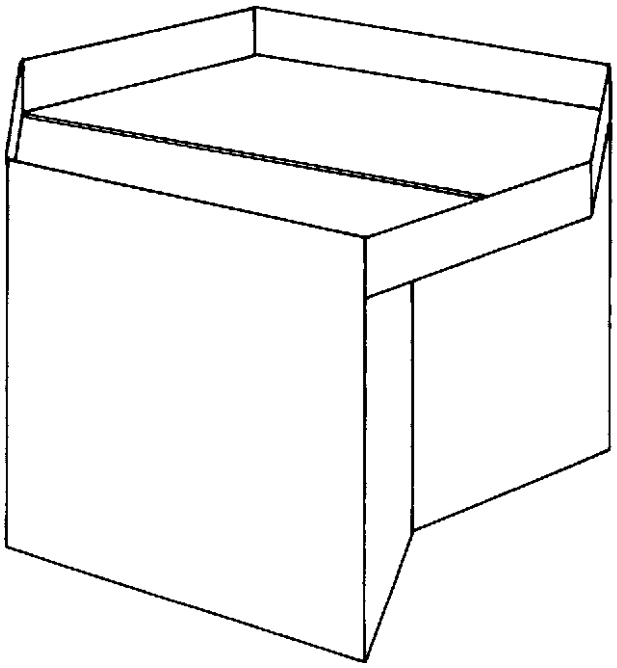


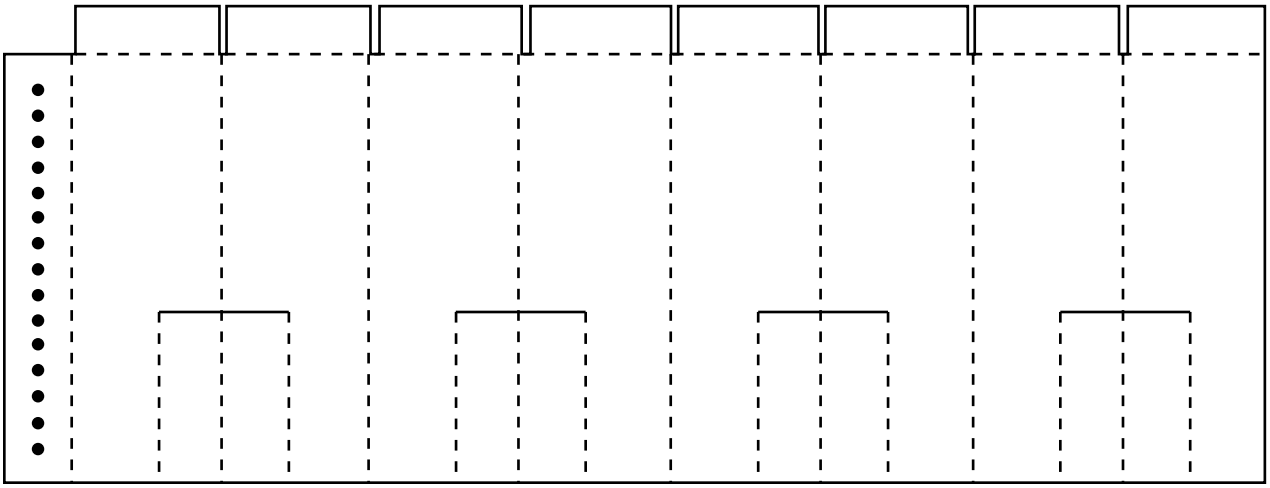
The slotted and scored insert carries the weight.

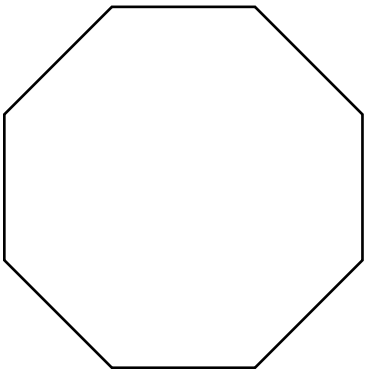


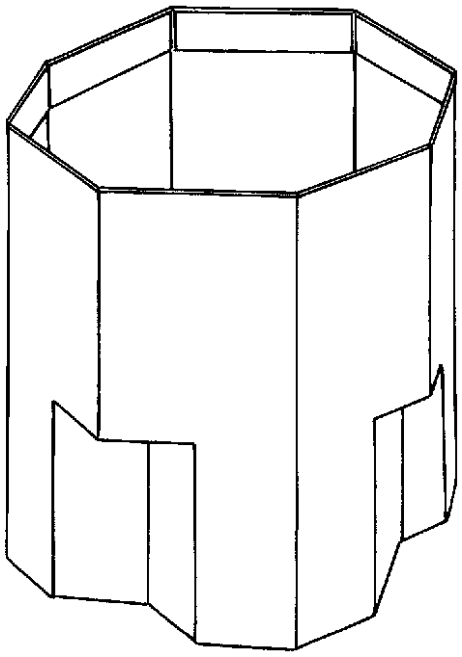


May be used by itself or as a base

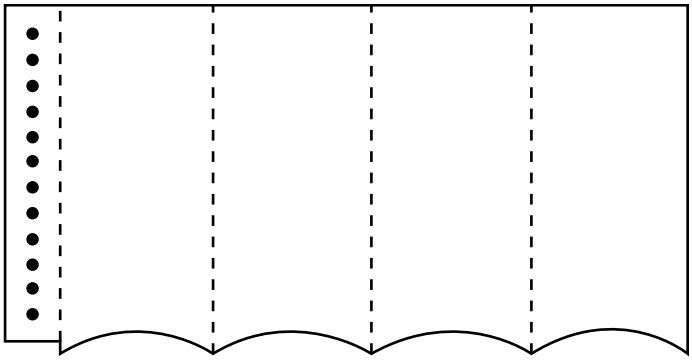


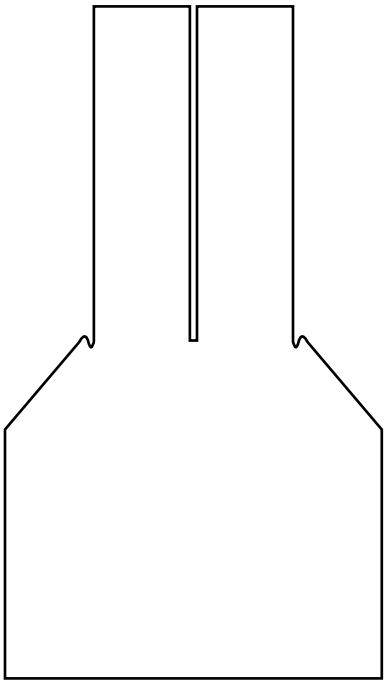


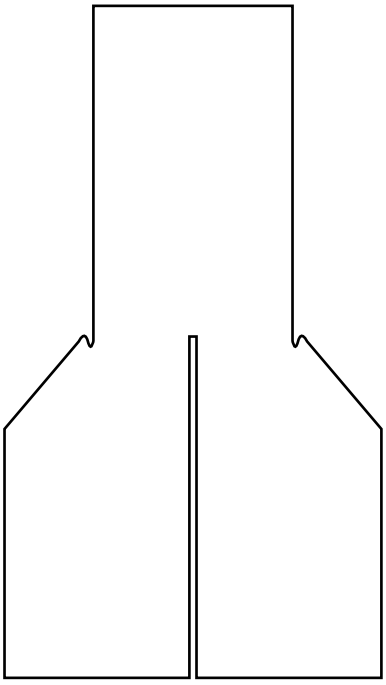


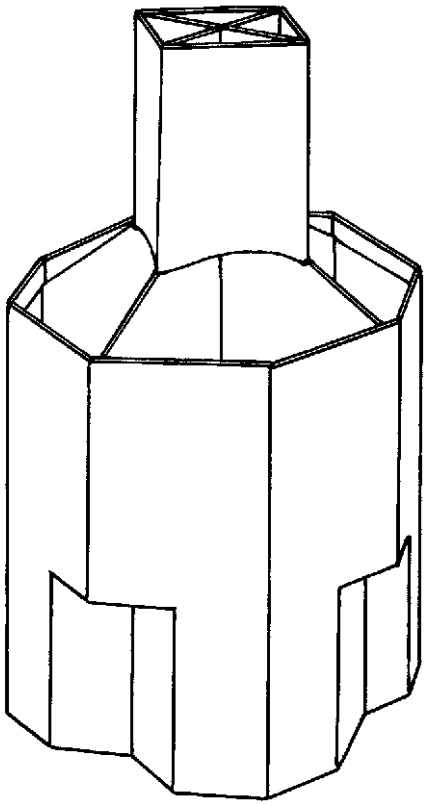


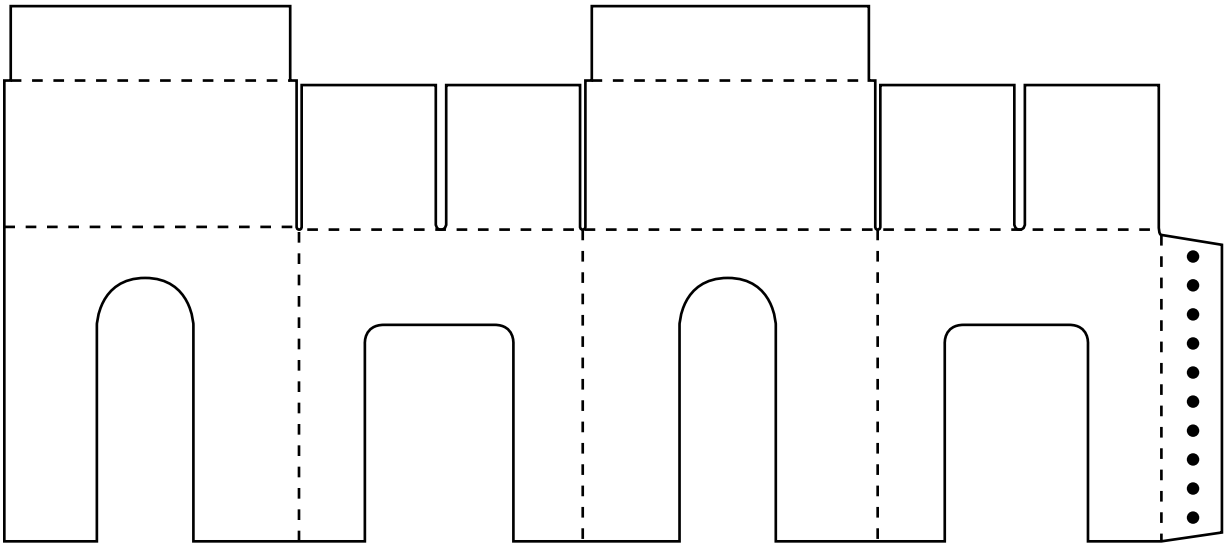
The scored and folded back base supports the platform.

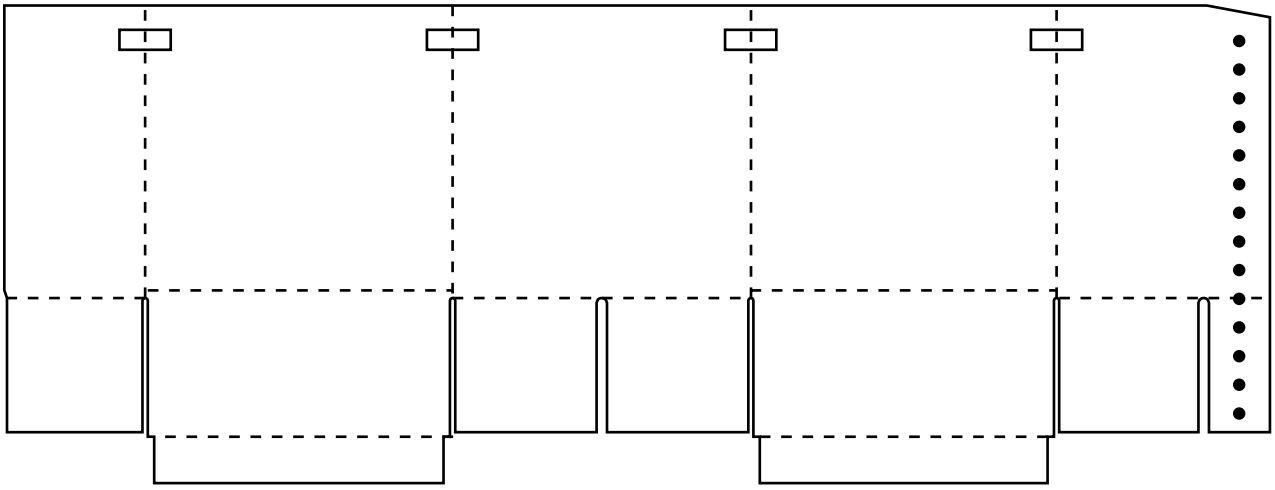


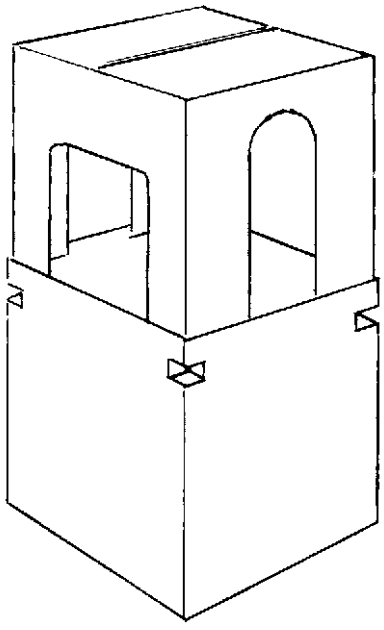


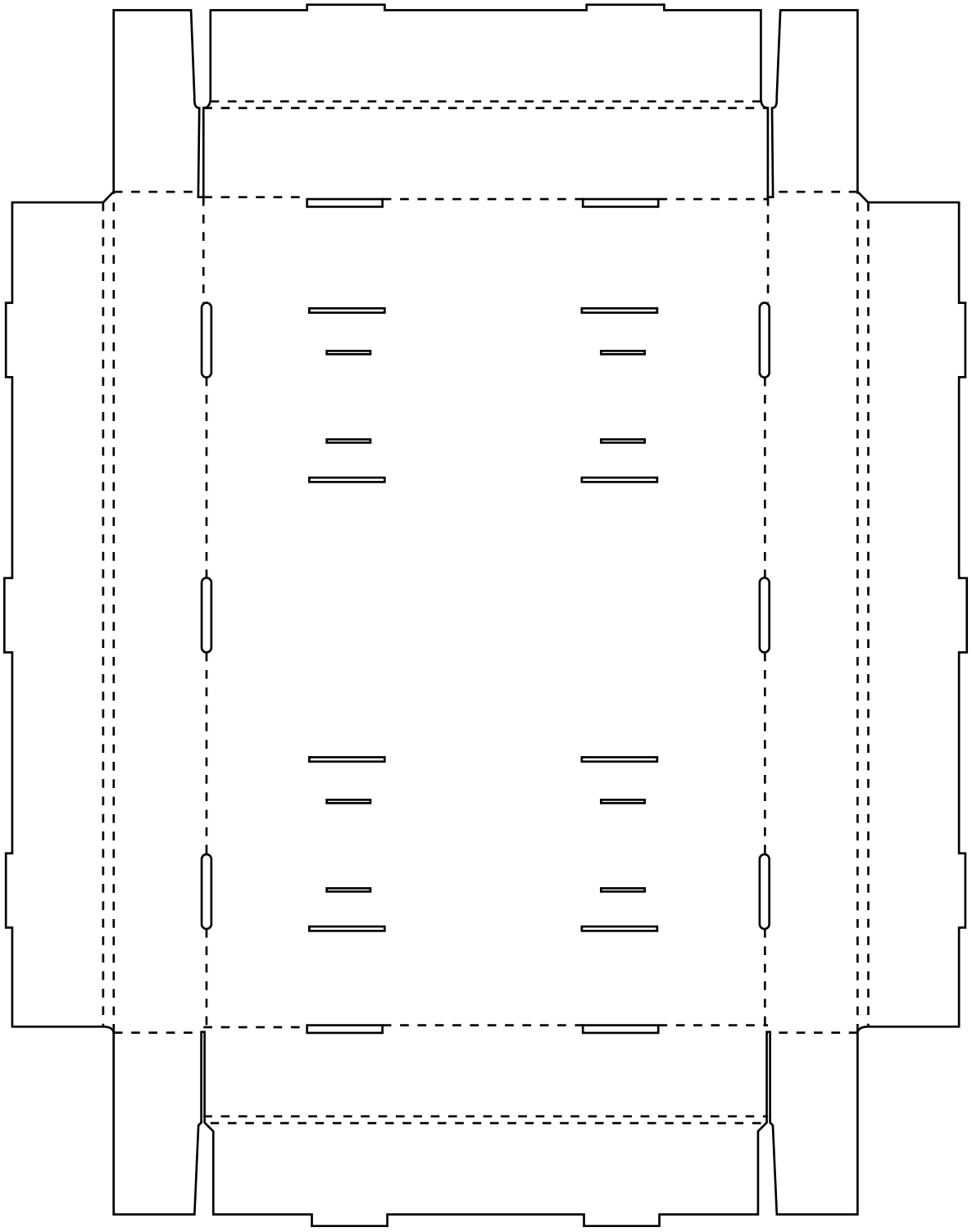




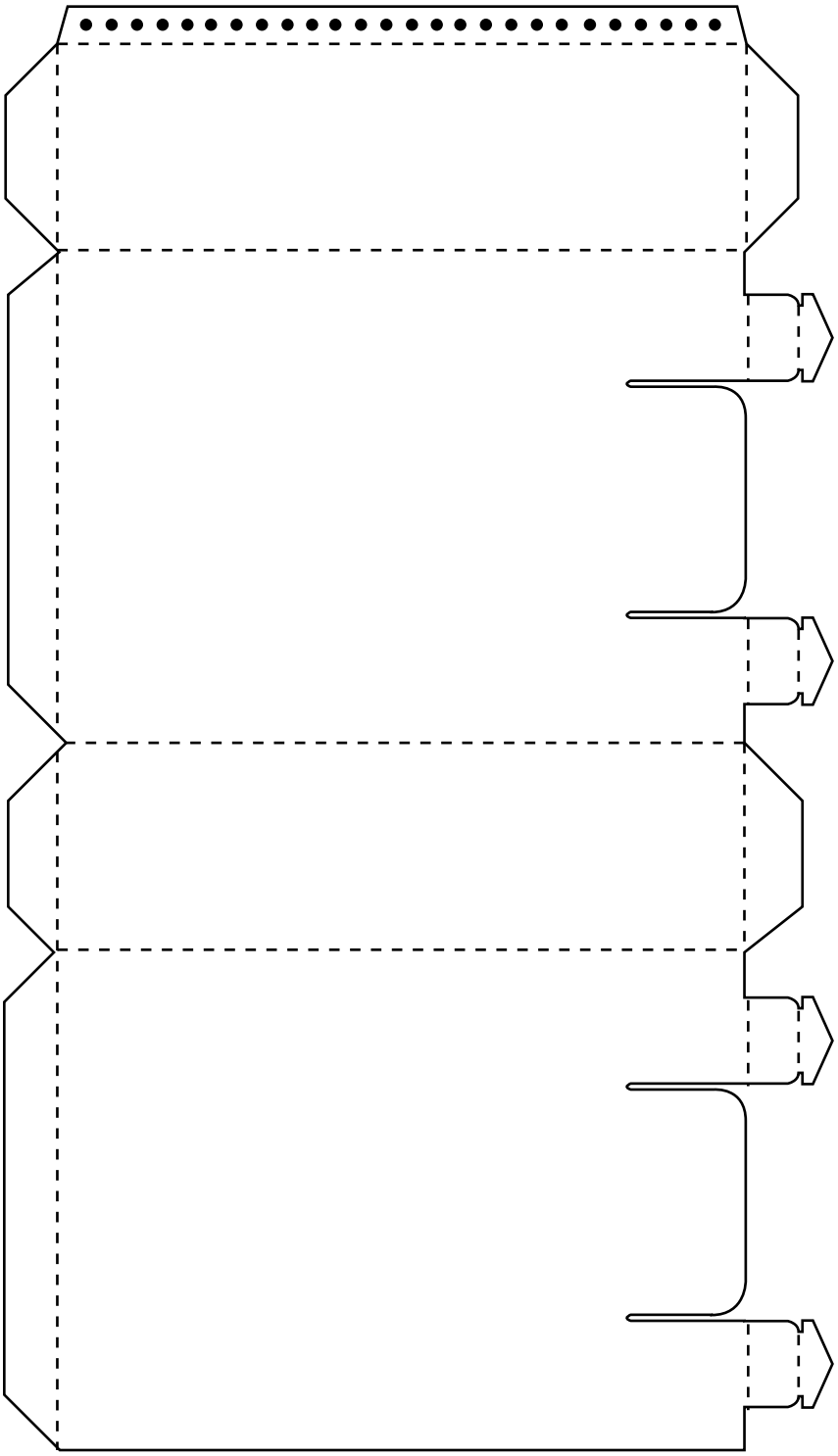


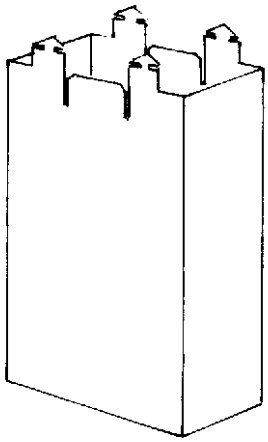




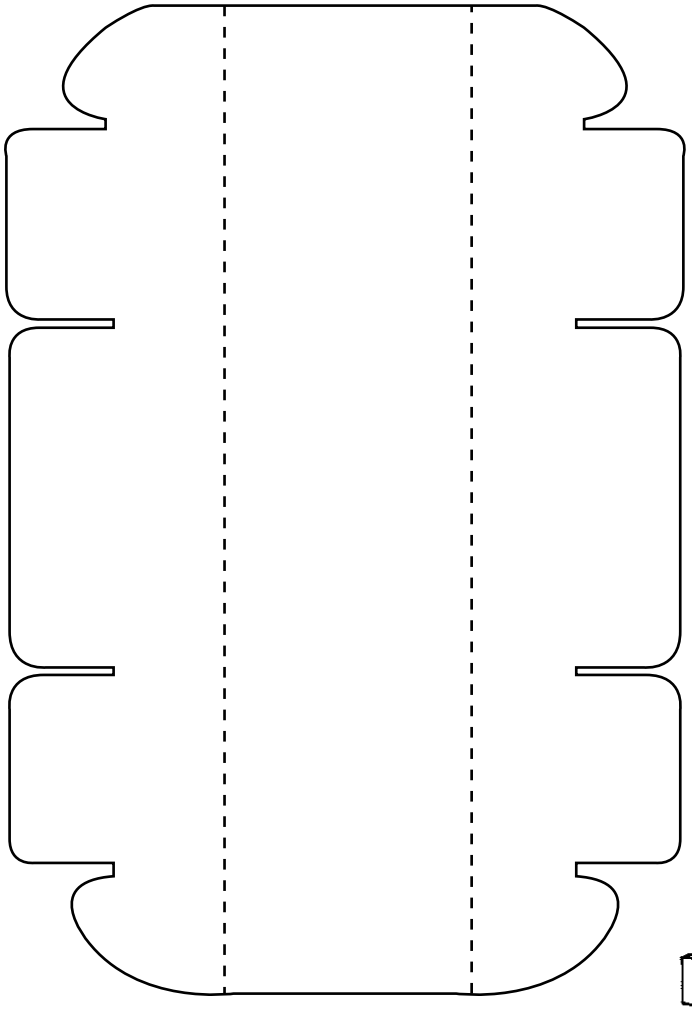


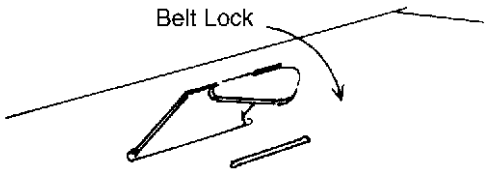
The corrugated speed table top features slots to accommodate the belt locks of the two stands.

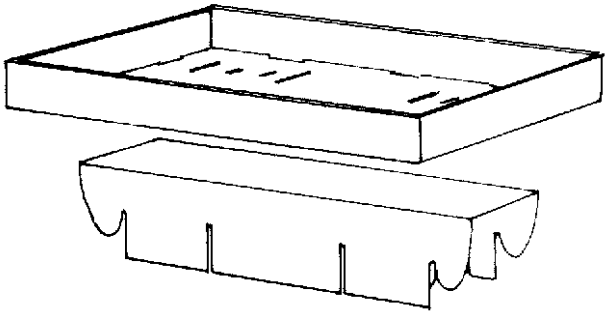


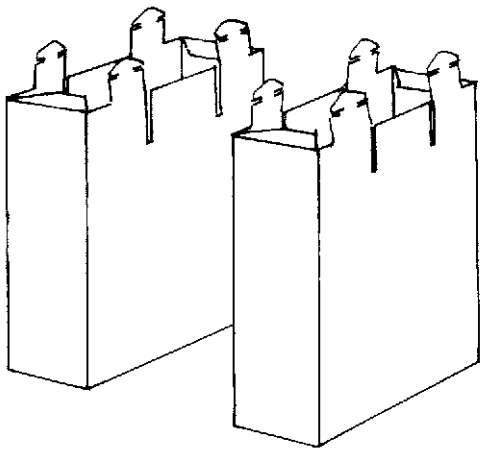


A pair of these units is required for the speed table. The belt locks secure the top to the stands and the slots mate with the support section.

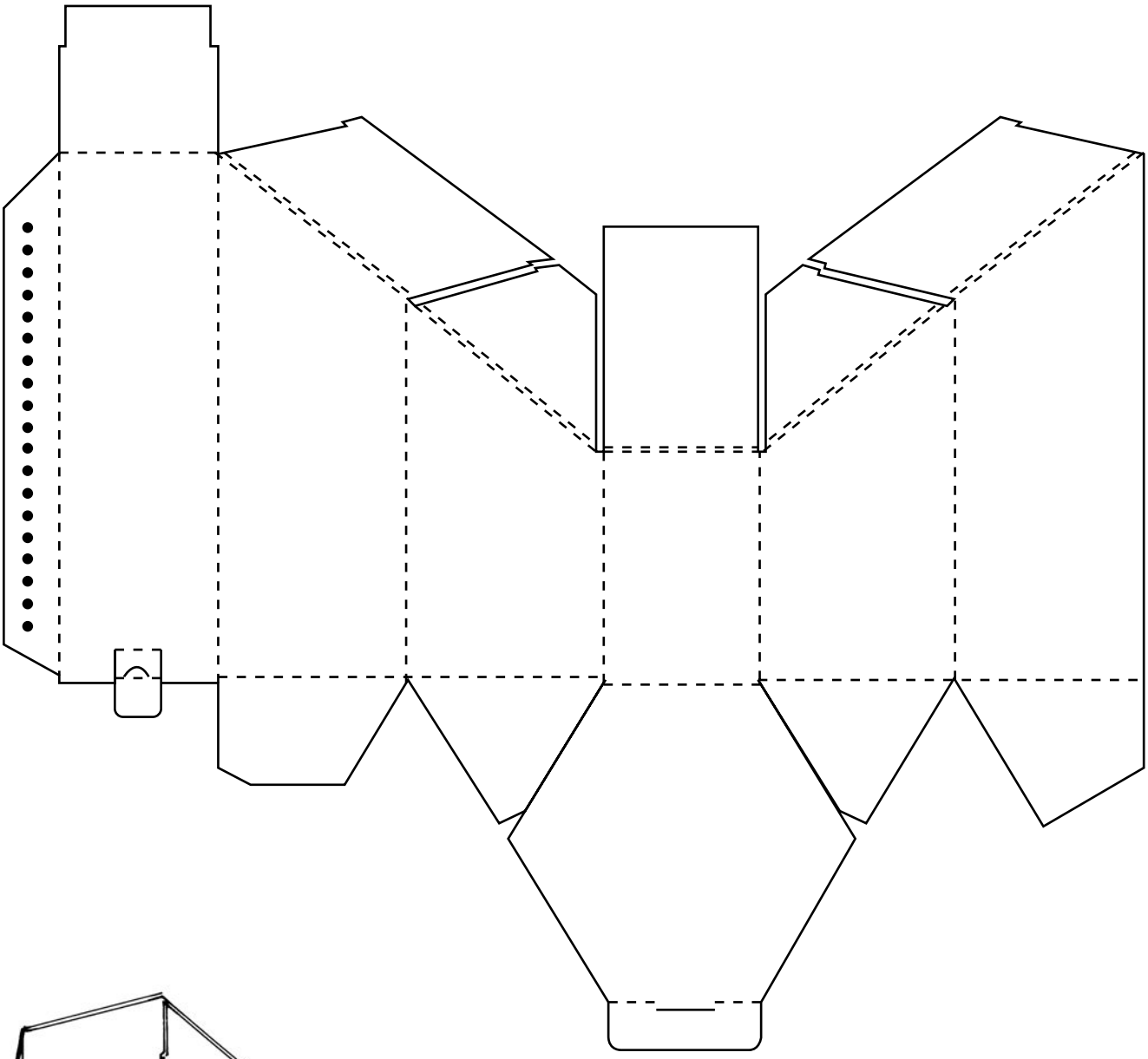


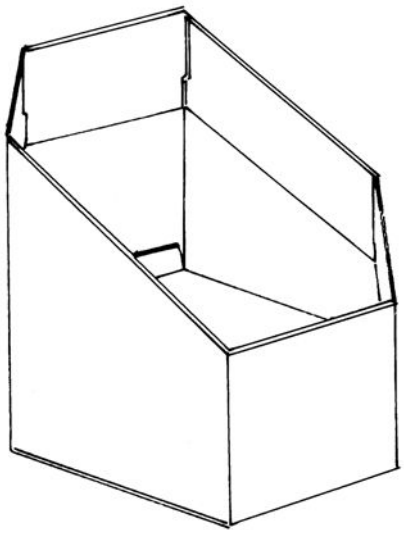


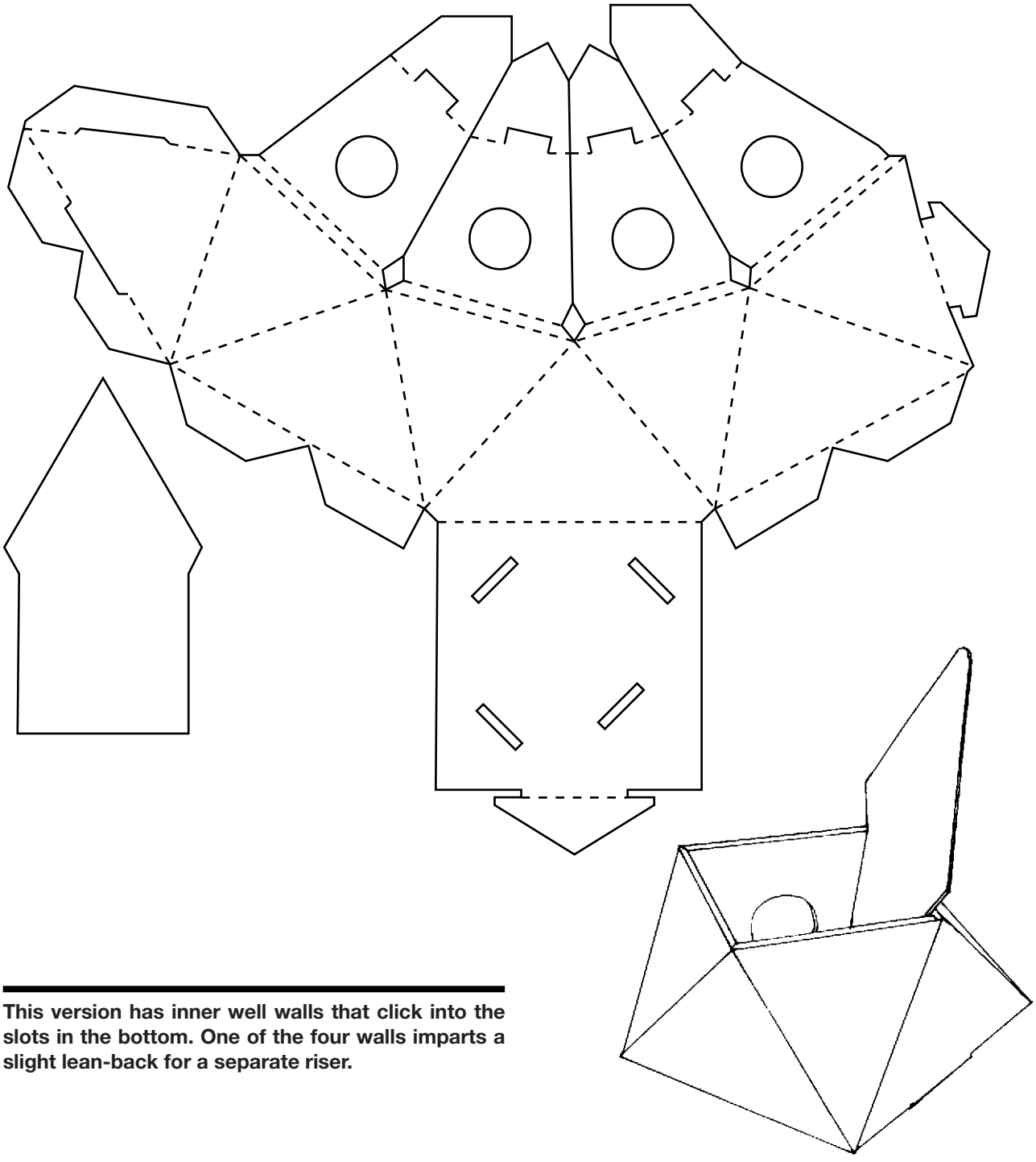




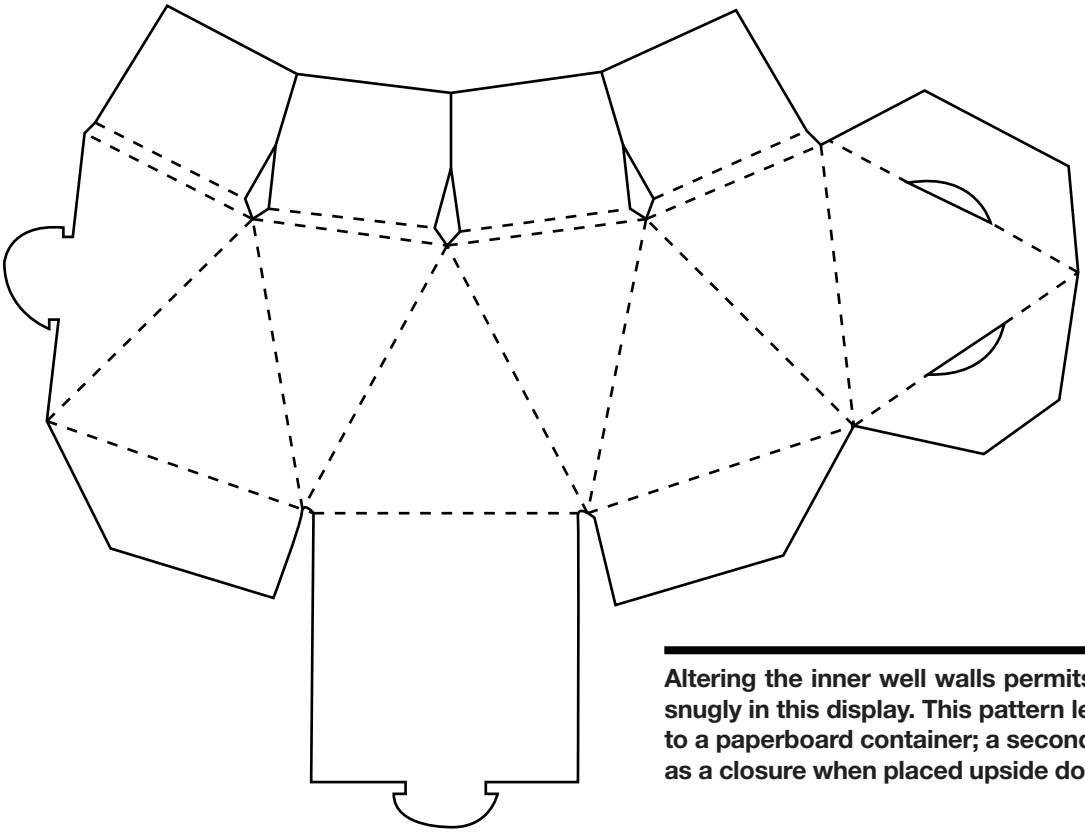
The slots in the support mate with the two leg sections. The top is then secured to the stand with the eight belt locks.



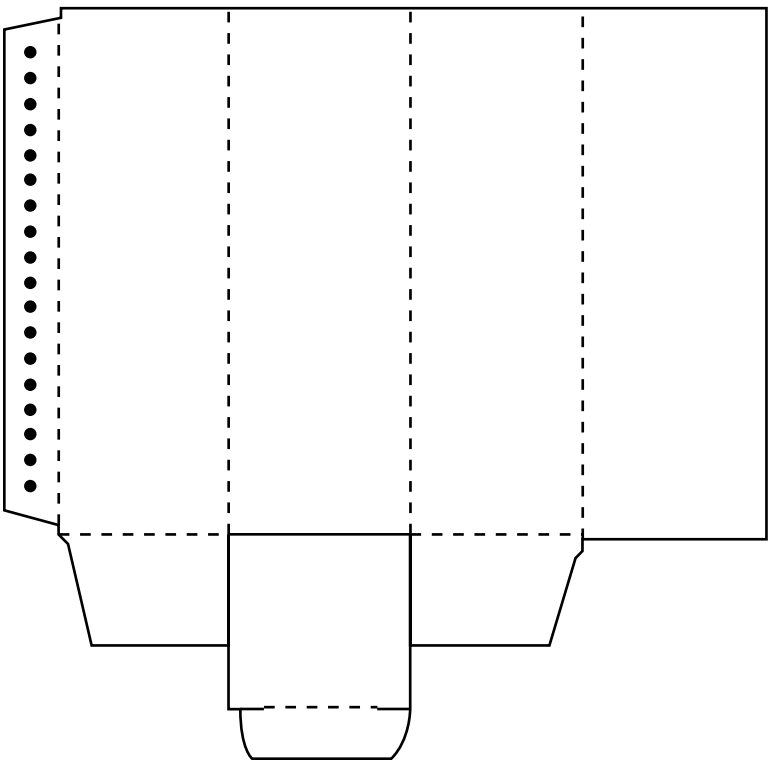


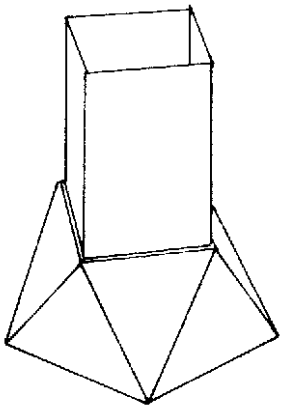


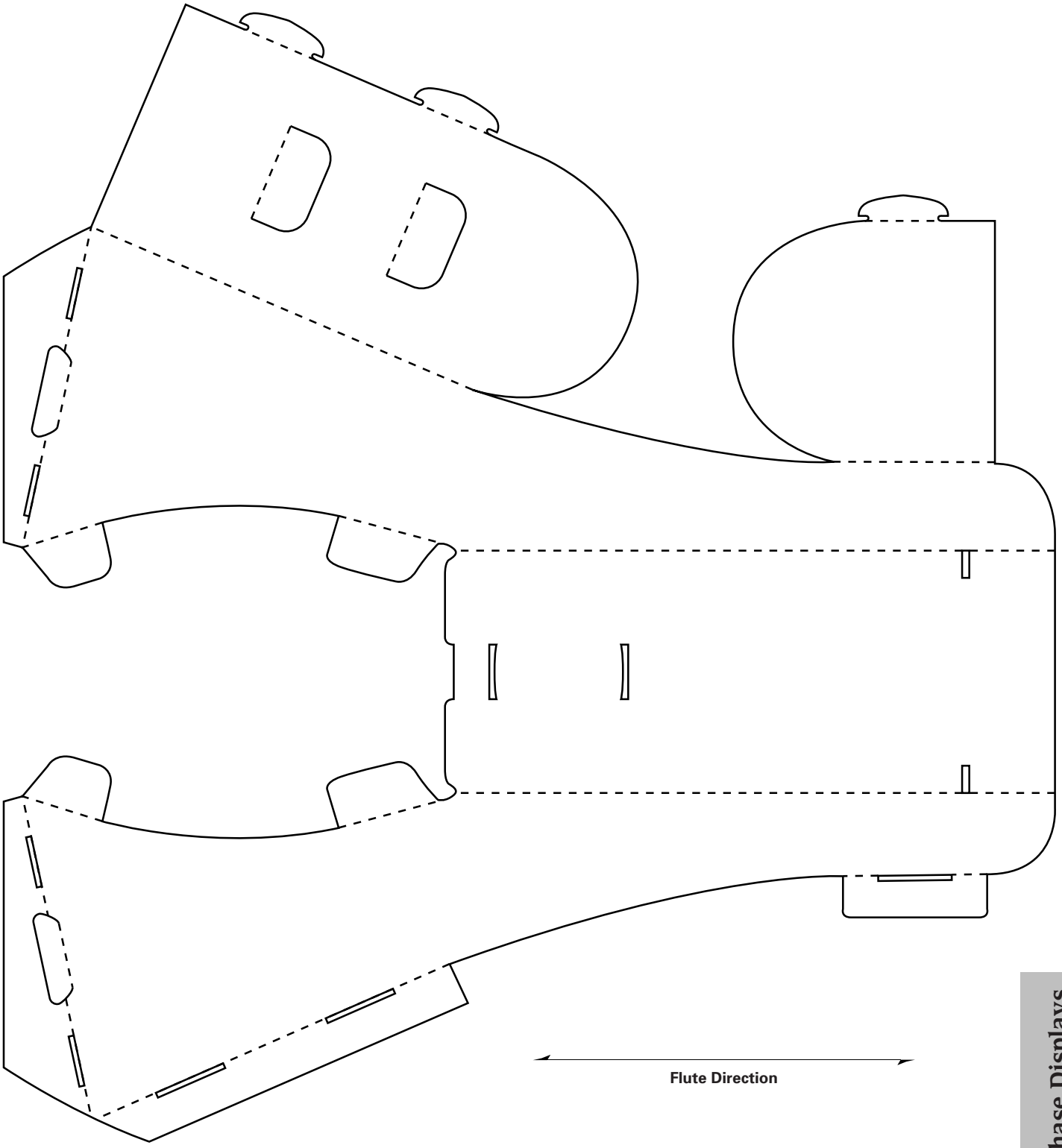
This version has inner well walls that click into the slots in the bottom. One of the four walls imparts a slight lean-back for a separate riser.



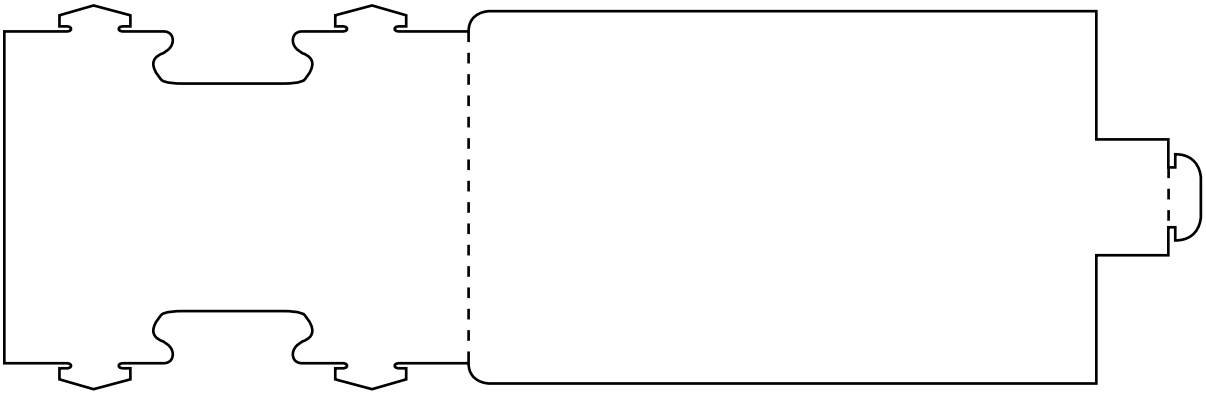
Altering the inner well walls permits the sleeve to fit snugly in this display. This pattern lends itself as well to a paperboard container; a second unit could serve as a closure when placed upside down over a sleeve.

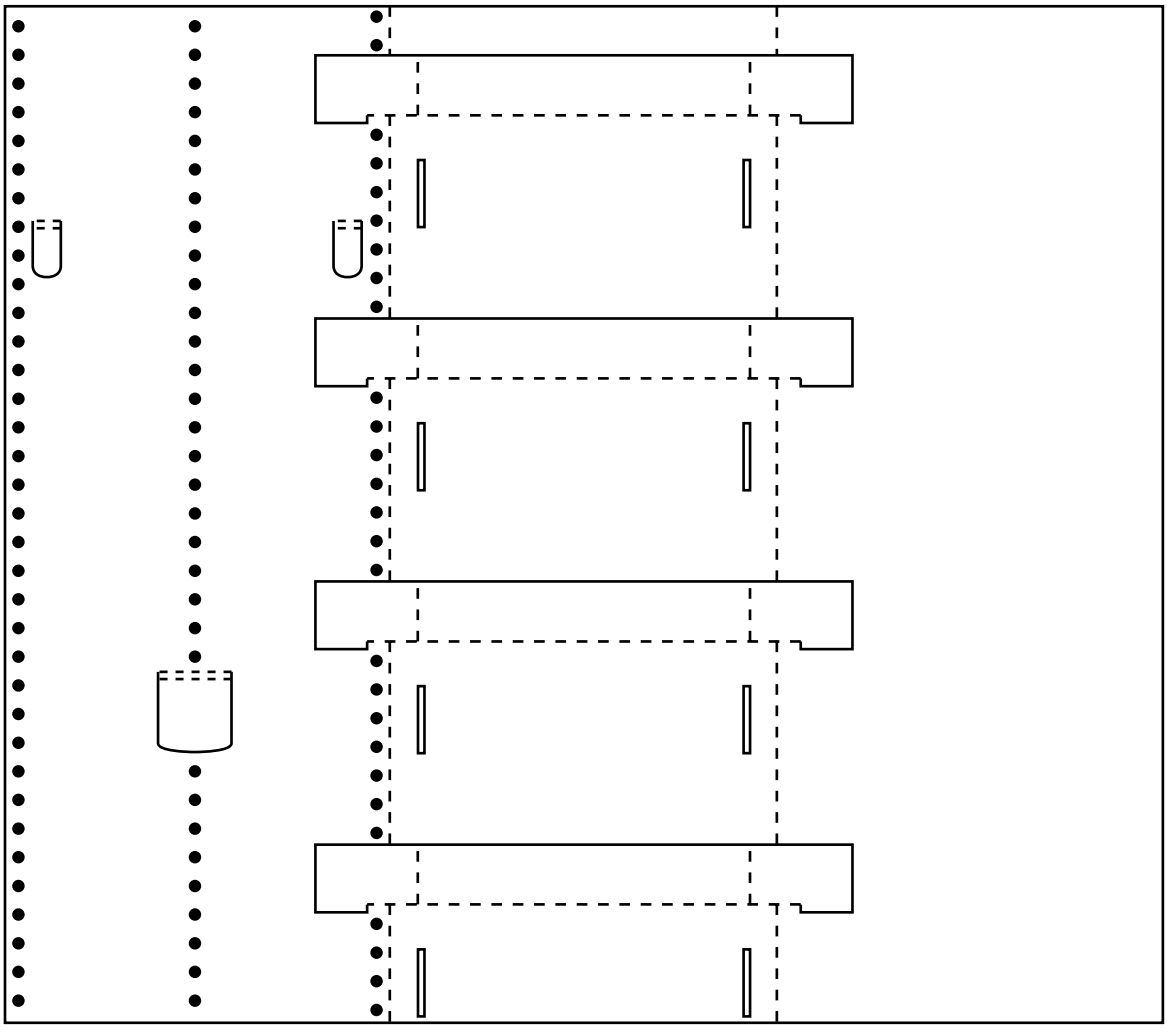


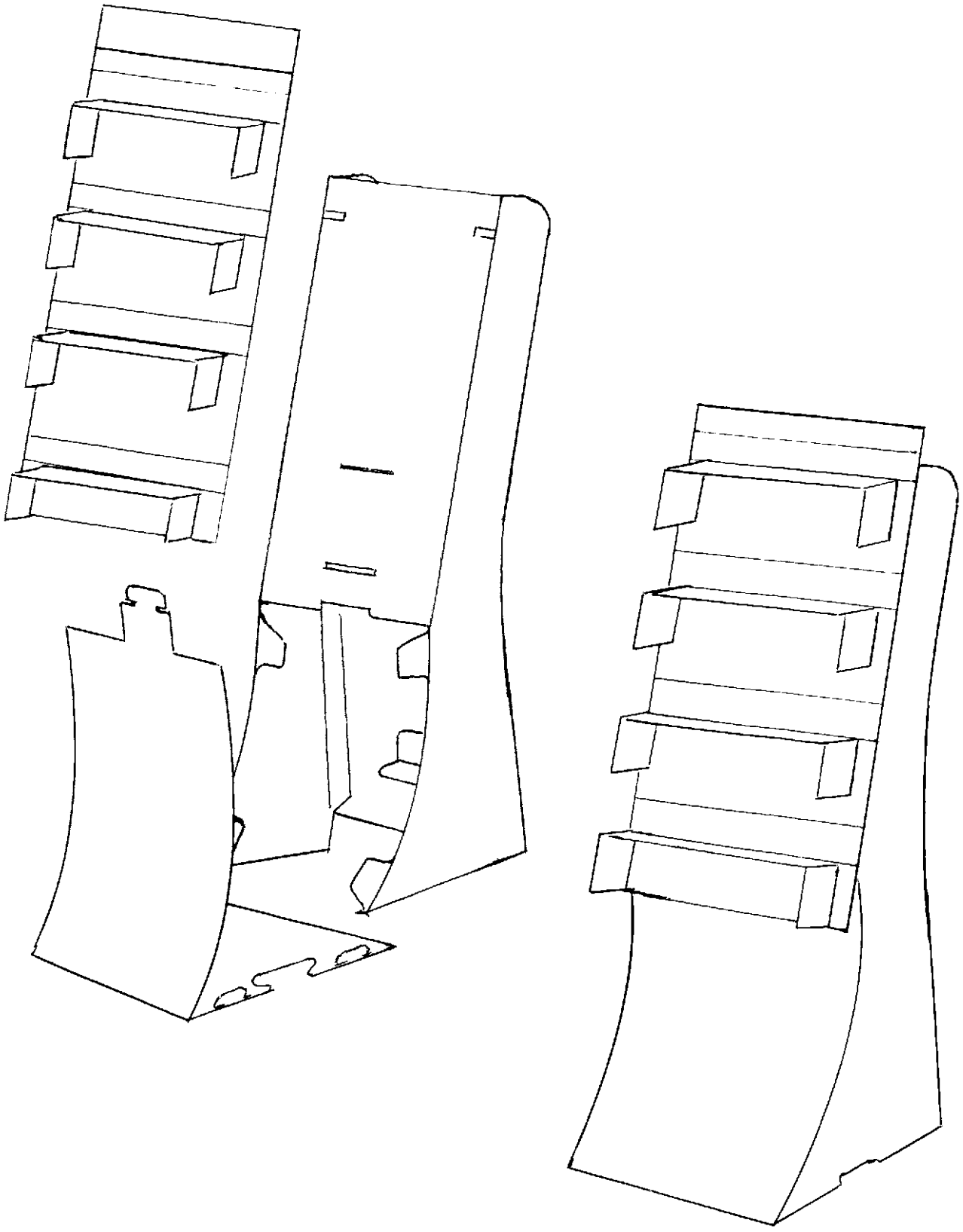


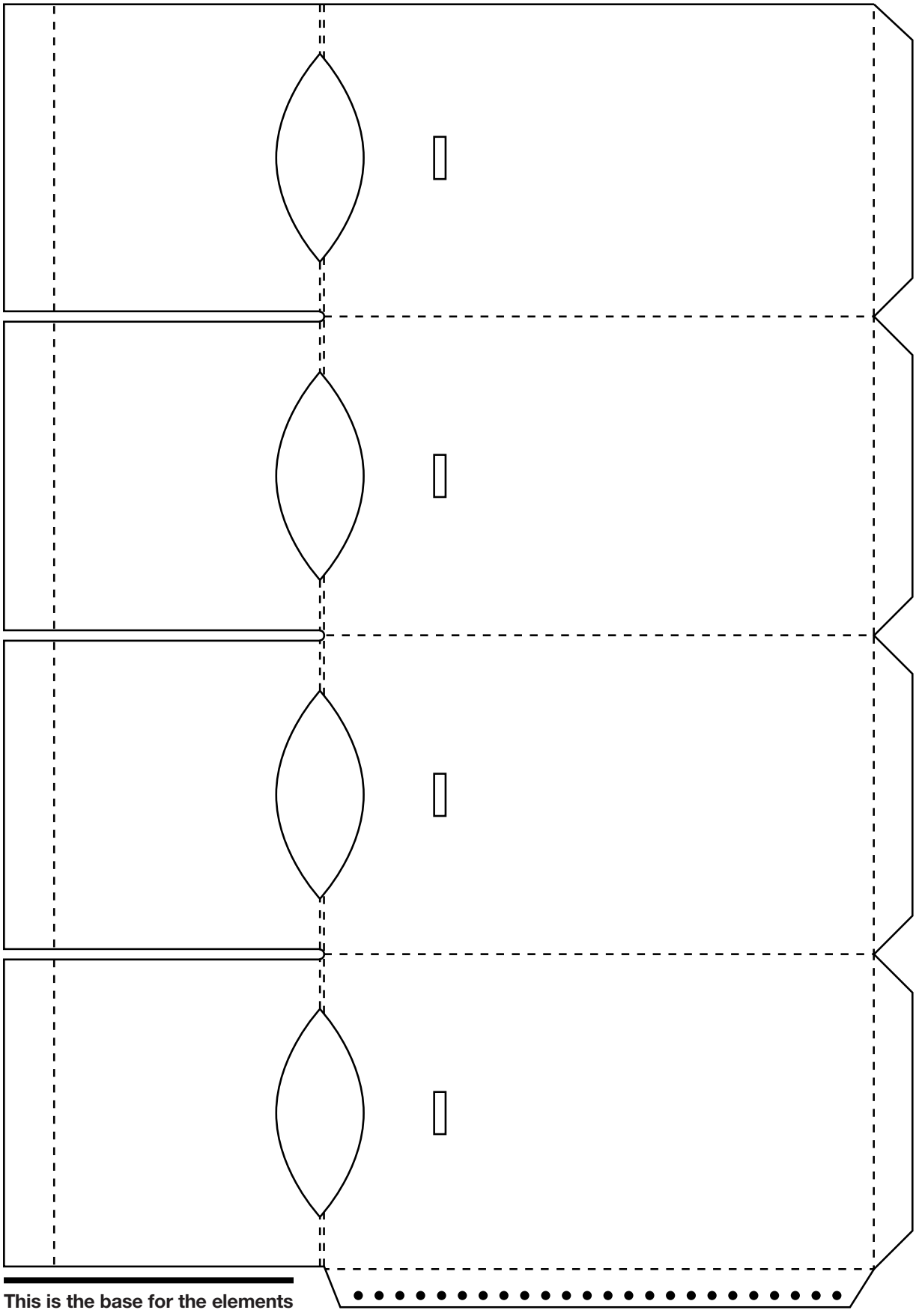


With the following two pages, this part makes up a four-shelf display.

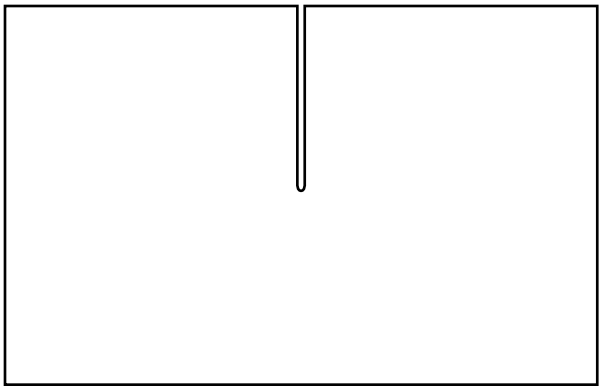


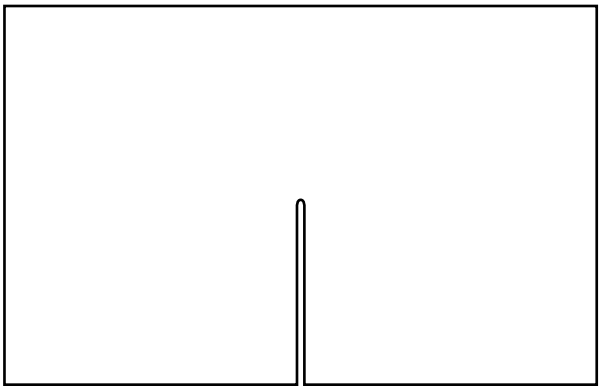


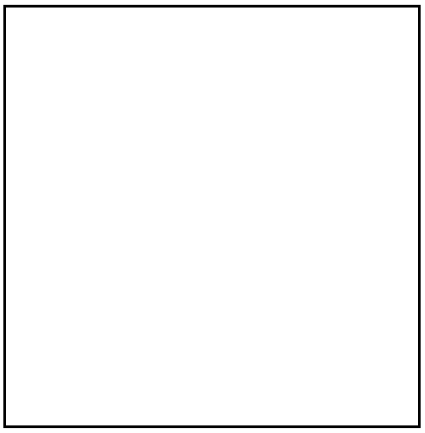


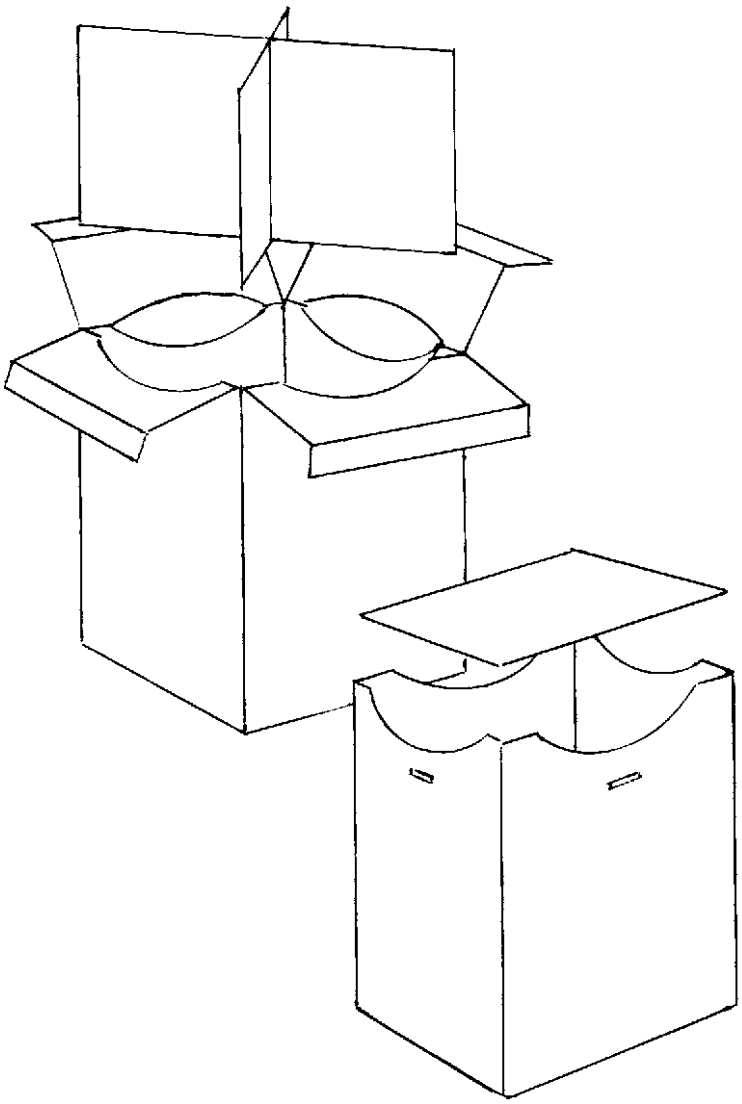


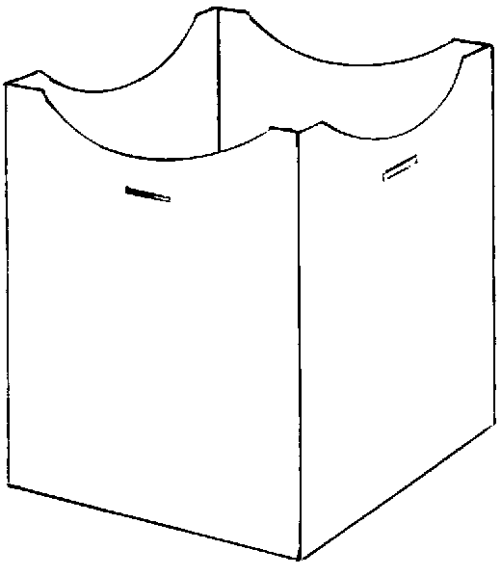
This is the base for the elements on the following five pages.

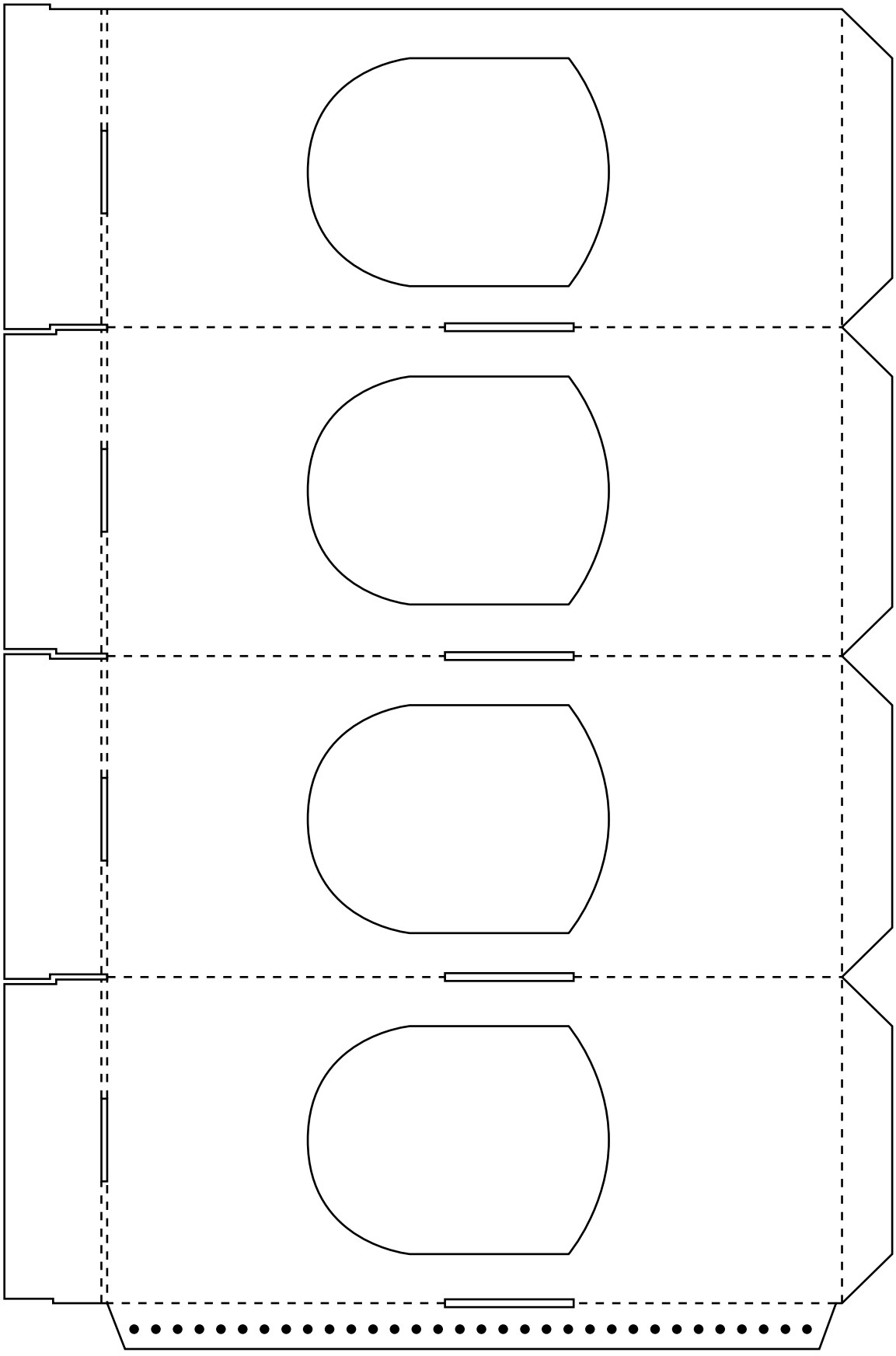


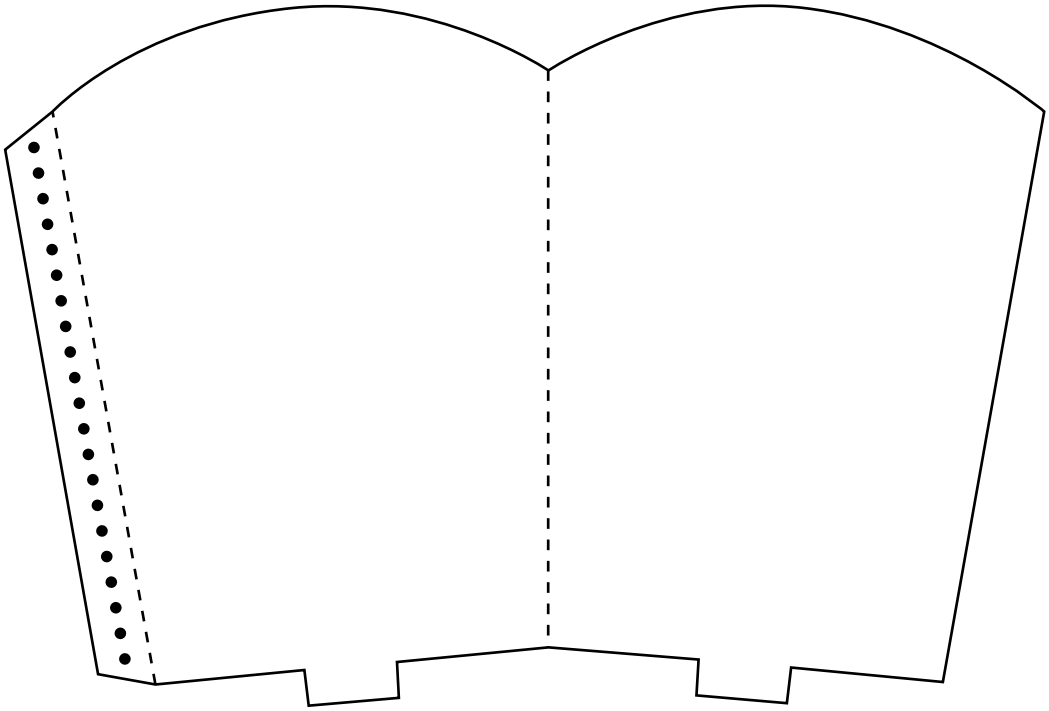


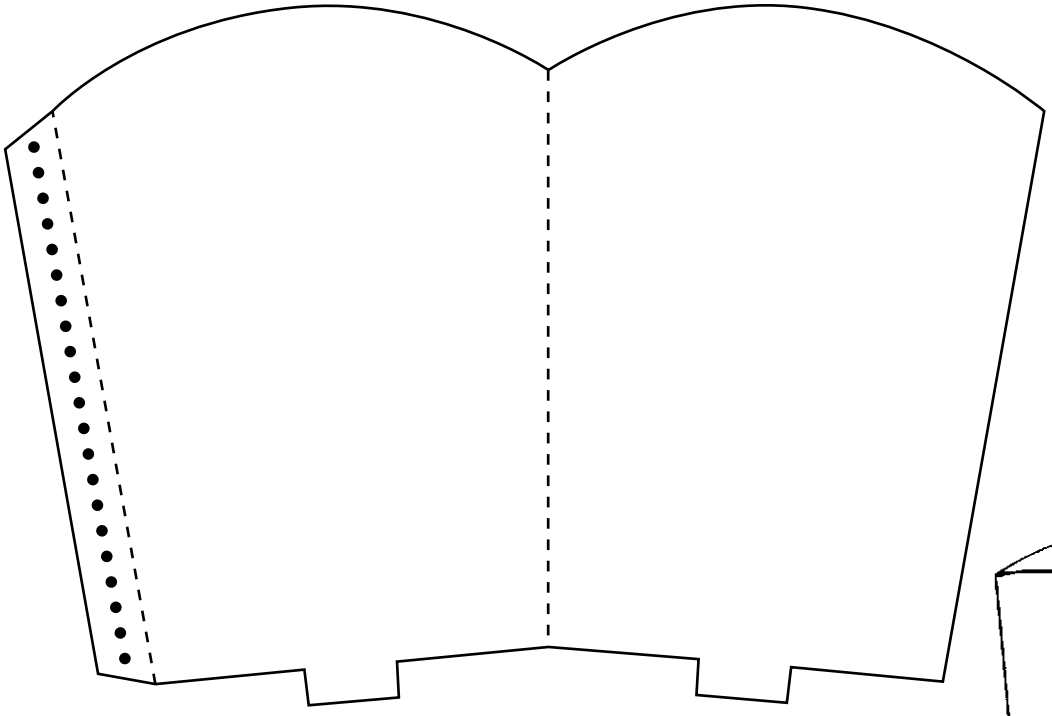


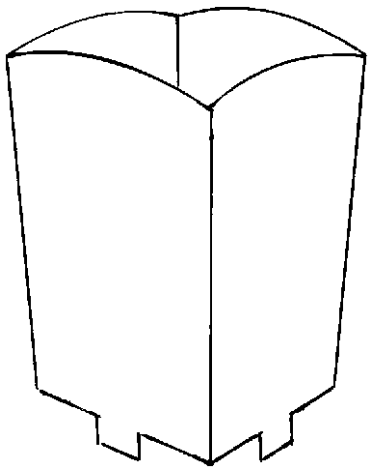


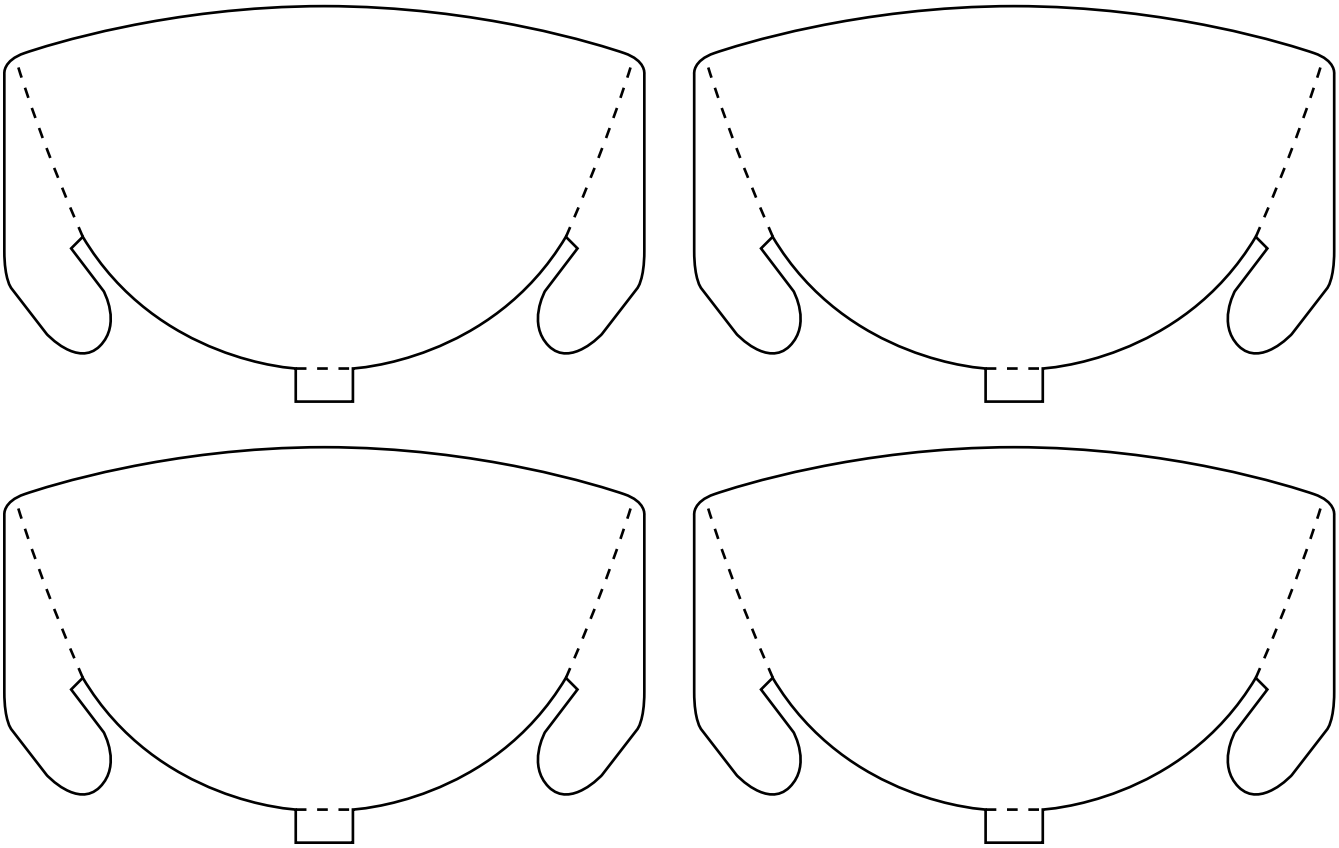


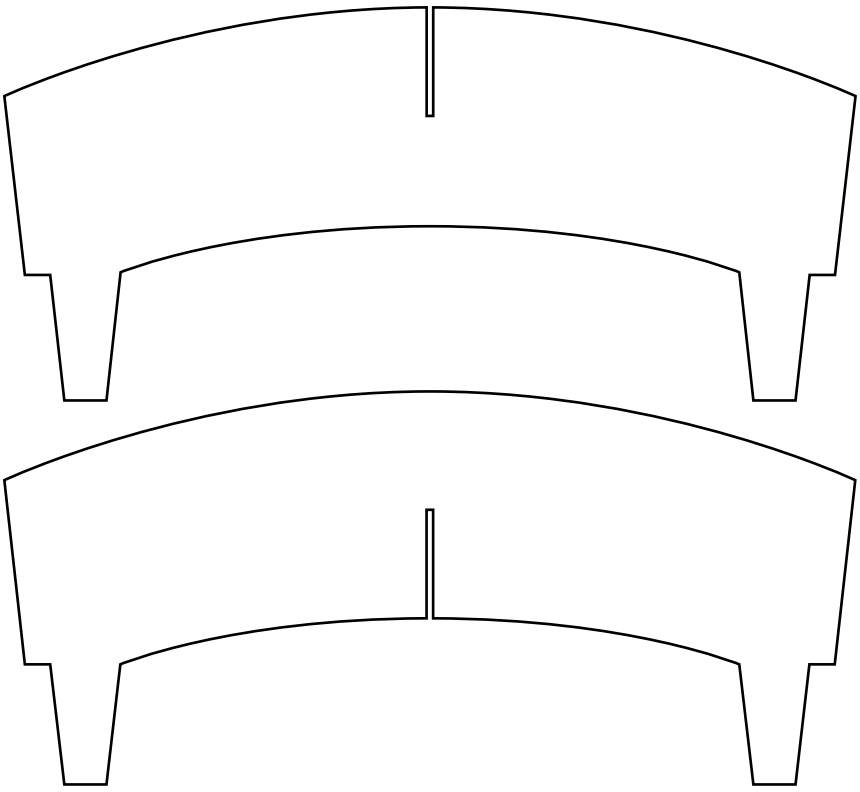


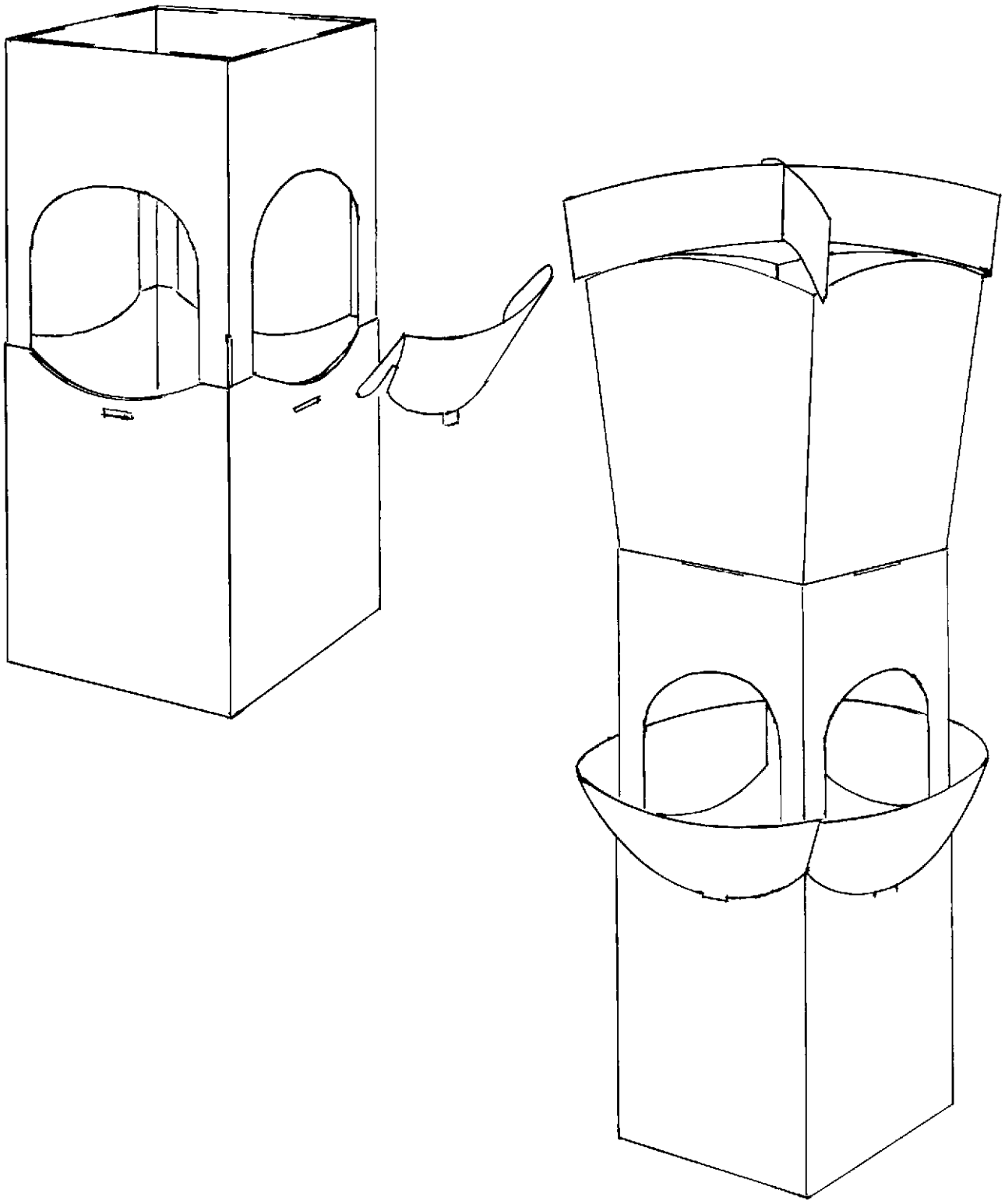


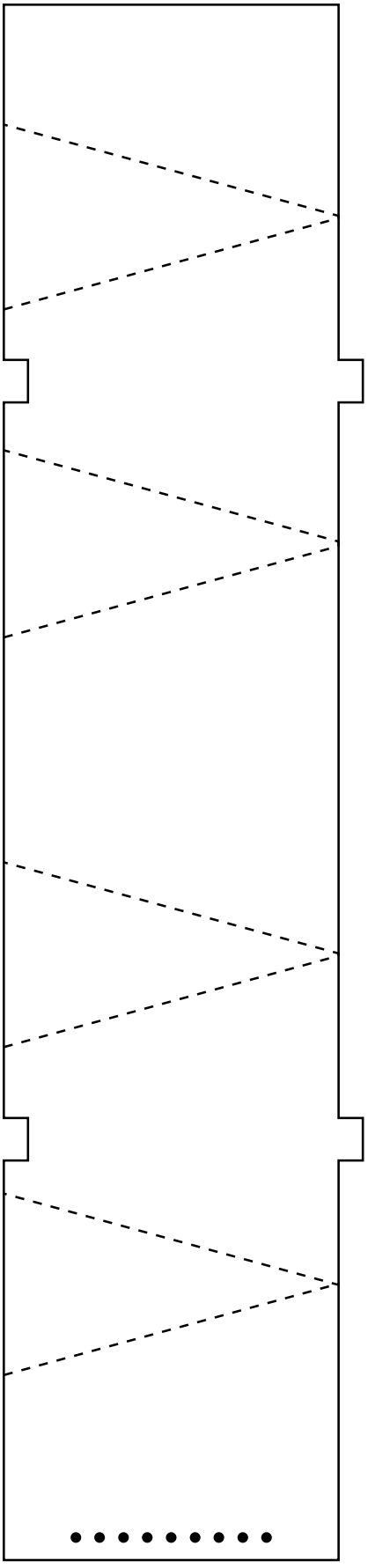


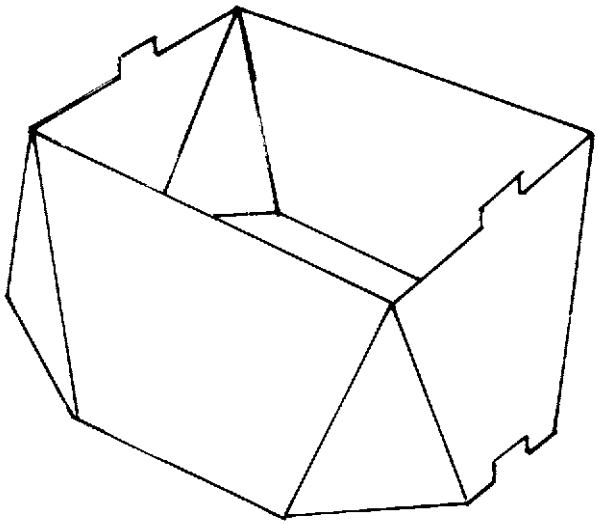


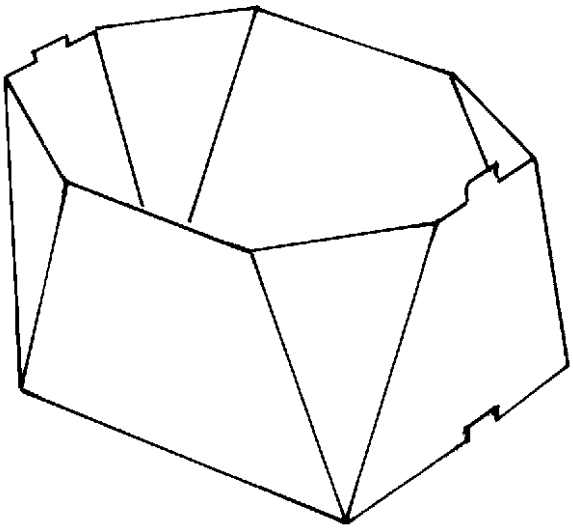




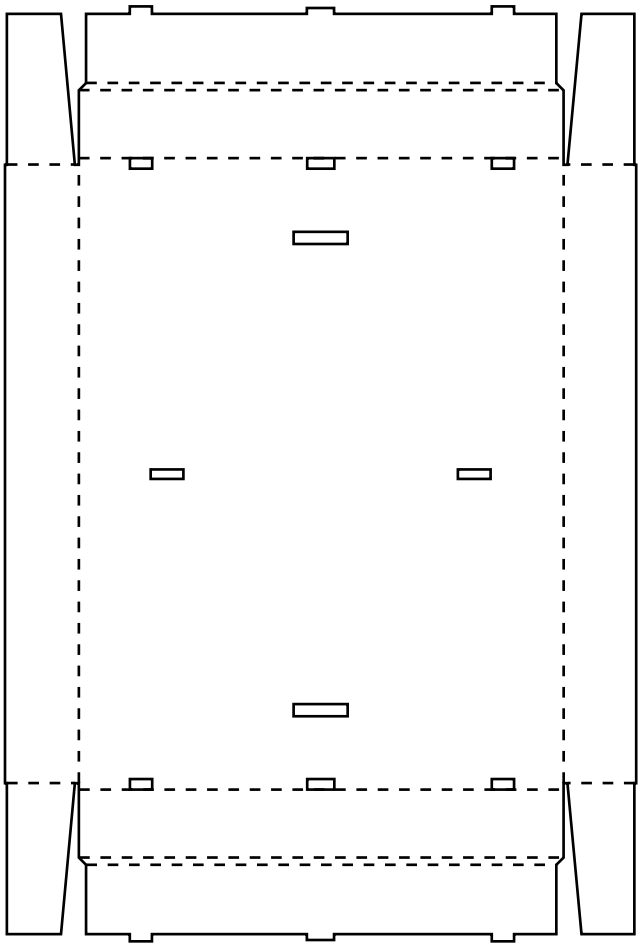


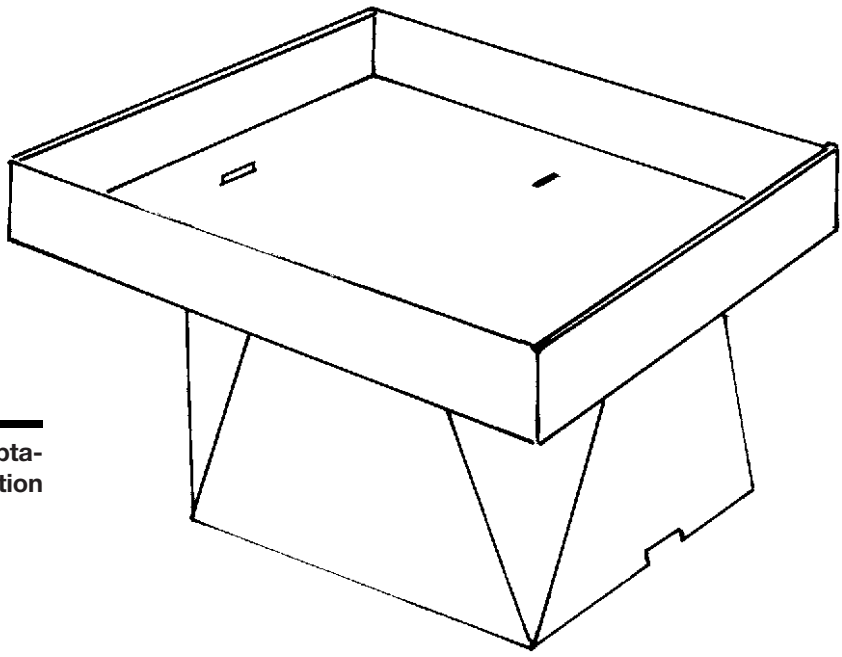




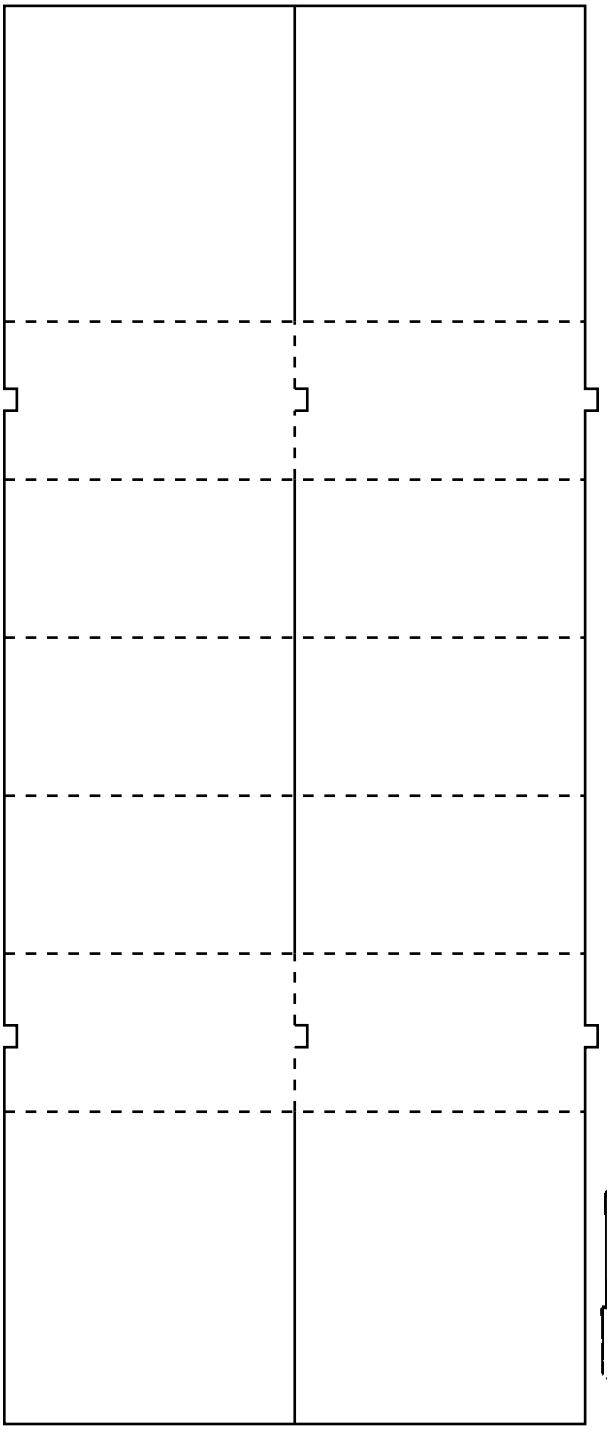


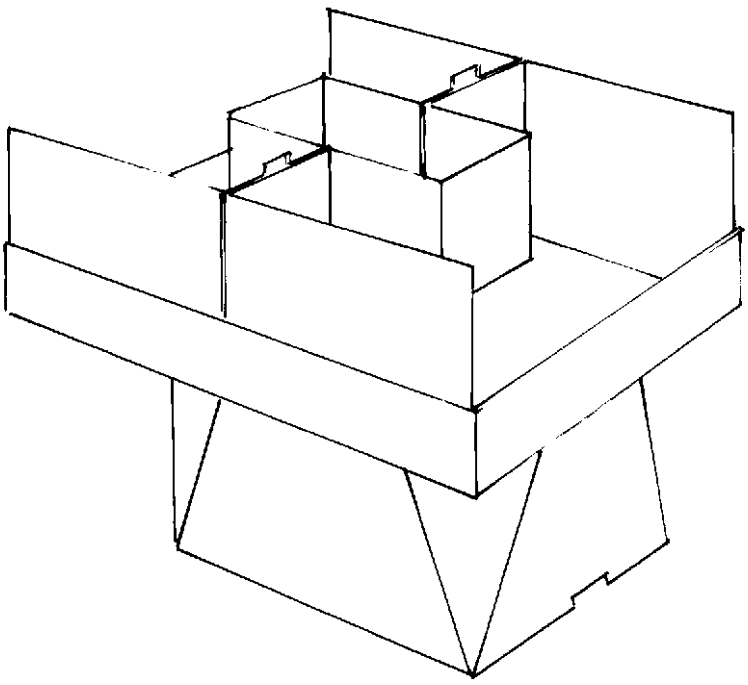
This base may be used either way as illustrated. The stacking tabs would have to be moved to the opposite side. See the next two pages.

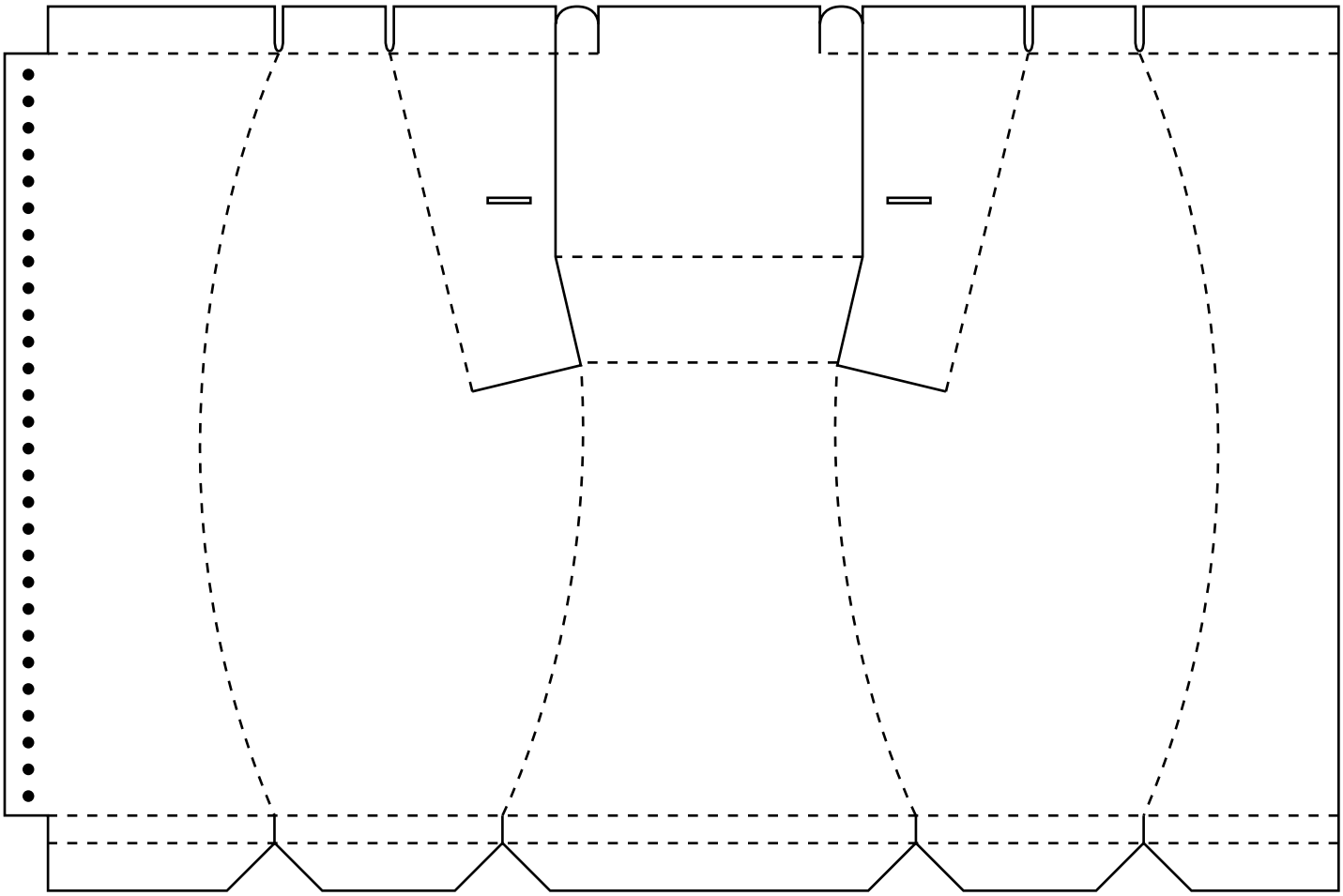


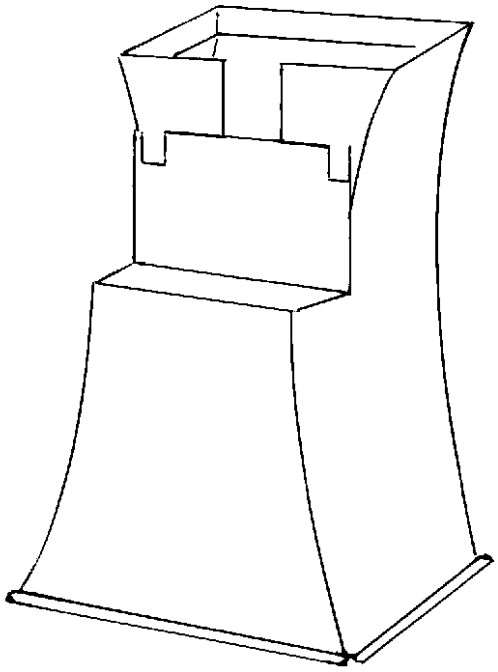


Double side walls with stacking receptacles for both the stand and the partition on the following page.









The outfold/infold at the base promote stability of the stand.

Glossary

Adhesion The process of attaching objects (e.g., by pasting, gluing) with adhesive materials.

Aseptic packaging Sterilized containers made of plastic-lined paper (foil and plastic lamination).

Base The lower or receptacle portion of a set-up box.

Blank A folding carton after die-cutting and scoring but before folding and gluing.

Blind embossing See *embossing.*

Box A complete paper box, including base and lid.

Brightwood box A tray-style carton made on the Brightwood machine.

Bundle A unit of boxboard containing 50 pounds of sheets.

Bursting strength test A test that measures the degree of resistance of a material to bursting.

Calendering A process in which paper is pressed between metal rollers to form a continuous sheet under controlled conditions of speed, heat, and pressure.

Caliper points A measure of paper thickness, expressed in units of a thousandth of an inch and usually written in decimals.

Carton A unit container made for bending grades of boxboard.

Chipboard Recycled paperboard.

Compression test A test in which force is applied by two flat surfaces to opposite faces of a box.

Converter A manufacturer that fabricates folding cartons from boxboard and other packaging materials (e.g., sheet plastics).

Corrugated line board and medium test A test that measures the amount of force required to crush a fluted corrugated medium; measures the stiffness of the material.

Corrugated paperboard A material constructed from alternating layers of fluted paperboard. (Flutes are classified as A, B, C, and E.)

Count The actual number of sheets of a given size, weight, and caliper required to make a bundle weighing 50 lbs.

Cutting and creasing die A steel rule form used on a press to cut and score sheets of boxboard into folding carton blanks.

Die-cutting The process of cutting shapes from paperboard using cutting or stamping dies or lasers.

Dividers Loose strips of paper or boxboard used to separate items of merchandise.

Double wall A material consisting of three flat facings and two intermediate corrugated members.

Drop test A mechanical procedure used to test the safety of package contents during shipping; determines the resistance of a filled box to shocks caused by dropping it in certain ways (i.e., on corners, edges, faces, etc.).

Easels Supports attached to a box to hold it upright for display.

Embossing A process in which paper is pressed between metal dies to create an image in relief.

Fiberboard A general term applied to fabricated paperboard utilized in container manufacture; may be either corrugated or solid.

Filled board Boxboard containing center plies consisting of different materials from those used for the top and bottom liners.

Flap lid A lid that has no sides or ends and is hinged to the base of the box.

Flexographic printing Printing from flexible plates made of rubber or plastic.

Flutes The wave shapes in the inner portion of corrugated fiberboard. The flute or corrugation categories (A, B, C, and E) indicate flutes per linear foot.

Folding carton See *carton.*

French lid A lid with an extension edge, sides, and ends; it fits outside the base of the box.

Furnish A mixture of water, pulp, paper scrap, sizing, dyes, and other additives that is fed into the wet end of a paper- or board-making machine.

Grain The direction in which the fibers in paper line up.

Gravure printing A printing process in which specially etched cylinders with cells to accept and store inks rotate the image to the impression cylinder, which transfers the image to paperboard.

Inner packing Materials or parts used in supporting, positioning, or cushioning an item.

Labels Die-cut, often self-adhesive applications used to decorate or identify packages.

Laminating Bonding together two or more layers of material, usually impregnated with thermosetting resin.

Laminator A machine that adheres two or more plies of paper or board.

Laser A device that produces a very narrow beam of extremely intense light; used in industrial processes, medicine, and detailed die-cutting.

Letterpress A printing method in which ink is transferred from a metal plate directly to a sheet of paperboard.

Lid The upper and covering portion of a paper box.

Lifts Strips of ribbon, cloth, tape, or paper attached to an inner tray, allowing it to be easily removed from the base.

Loose wrapping A process in which a lid is covered with paper on a wrapping machine or by hand; the wrapper is a single piece with adhesives only at the edges.

Manufacturer's joint The seam of a carton, where the two edges of the box are joined together by stitching, gluing, or taping.

Master carton A carton that is used to ship smaller cartons.

Neck A shell inserted in the base of a shoulder box, attached by an adhesive and extending above the base into the lid.

Newsback Chipboard that is lined on one side; used for inexpensive printing.

Offset printing (lithography) A printing method in which ink is transferred from a plate to a smooth rubber "blanket" roller that transfers the image to paperboard.

Padded top An extra top, covered with paper or cloth and including one or more layers of wadding or other padding material, that is attached to a top lid.

Paperboard (cardboard) A material made from laminated layers of paper in sheets of 12 points or more.

Paper stock Reclaimed (recycled) material that has been pulped for the use as a finish for paperboard; includes newsprint, reclaimed corrugated containers, and mixed paper and boxboard (kraft) cuttings.

Paster A machine that applies an adhesive to two or more plies of paperboard.

Ply A layer of boxboard formed on a multicylinder machine.

Pulp Basic cellulose fibers resulting from the disintegration of wood, rags, and other organic

materials by chemical or mechanical processes; used to make boxboard.

Puncture test A test of the strength of material, expressed in ounces per inch of tear, as measured by the Beach puncture tester.

Recycling The use of previously used materials to make new objects.

Scoring Making an impression or crease in a box blank to facilitate bending, folding, or tearing; feeding boxboard sheets through a scoring unit.

Set-up paperbox A paperbox or rigid construction that has been formed or set up and is ready for use (as opposed to a folding carton or shipping container; see *corrugated box*).

Shell A plain, unprinted carton designed to be overwrapped with plain or printed paper, fabric, or other materials.

Shoulder box A box with a glued neck inserted so that its base, ends, and sides form a shoulder on which the lid rests.

Slide box A box in which the lid is the form of a shell into which the base is inserted at the side or end.

Stay Material used to reinforce the corners of a base, lid, or tray; may be paper, cloth, combination (cloth and paper), wire, metal, or plastic tape.

Stitching, stapling, and taping The application of metal fasteners or tapes to form or close a box.

Telescope box A box in which the sides and ends of the lip slip over the base to either partial or full depth.

Tight wrapping The process of covering a base, lid, or tray with paper on a wrapping machine or by hand; the wrap is a single piece whose entire surface is covered with adhesive.

Tray-style carton A folding carton with a hinged cover extending from the side walls.

Trim Paper or cloth covering to strengthen or decorate base edges and lid or extension edges.

Triple wall A material consisting of four flat facings and three intermediate corrugated members.

Tube-style carton A folding carton that encloses a product with flap, tucks, and locks.

Tuck The end portion of the top of bottom flap of a folding carton, which is inserted into the container to hold the end flaps in place.

Universal Product Code (UPC) A printed code on containers and other forms of packaging that provides information about the product for purposes of inventory control and retail pricing.

Vibration test A method of checking vibration during transportation.

Water absorption test A measure of resistance to water absorption; applied to boxes impregnated with water- and moisture-resistant coatings.

Web A roll of paper or other flexible material as it moves through the machine in the process of being converted.

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